



# Russell Traffic Study

KDOT 281-84 KA-4176-01

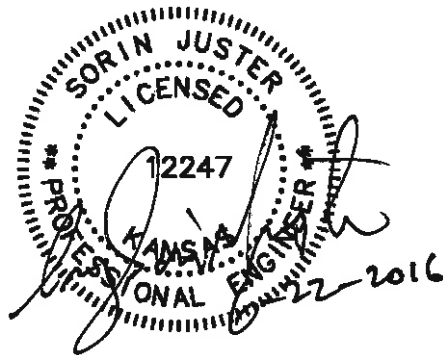


RUSSELL TRAFFIC STUDY

RUSSELL  
RUSSELL COUNTY, KANSAS

JUNE 2016

Prepared for:  
KANSAS DEPARTMENT OF TRANSPORTATION



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## INTRODUCTION

1.1 This report summarizes the findings and recommendations of a traffic study conducted on Highway 281 north of the interchange of I-70 in Russell, Kansas. The study area extended north 0.5 miles to East Witt Avenue. The location of the study and intersections where traffic counts were taken can be found in Figure 1.

The City of Russell and local business owners have displayed interest in developing the area directly east of Highway 281 with additional commercial zoning. The additional traffic generated from this development needed to be evaluated so that the City and Kansas Department of Transportation (KDOT) could adequately plan for the growth in this area. Even without this potential growth, the City has expressed the desire to address some of the current safety issues.

A stakeholders meeting was held at the beginning of this study to gather information on the study area and the proposed development. In attendance were representatives from KDOT, the City of Russell, and the 24/7 Store.

### 1.2 Data Gathering

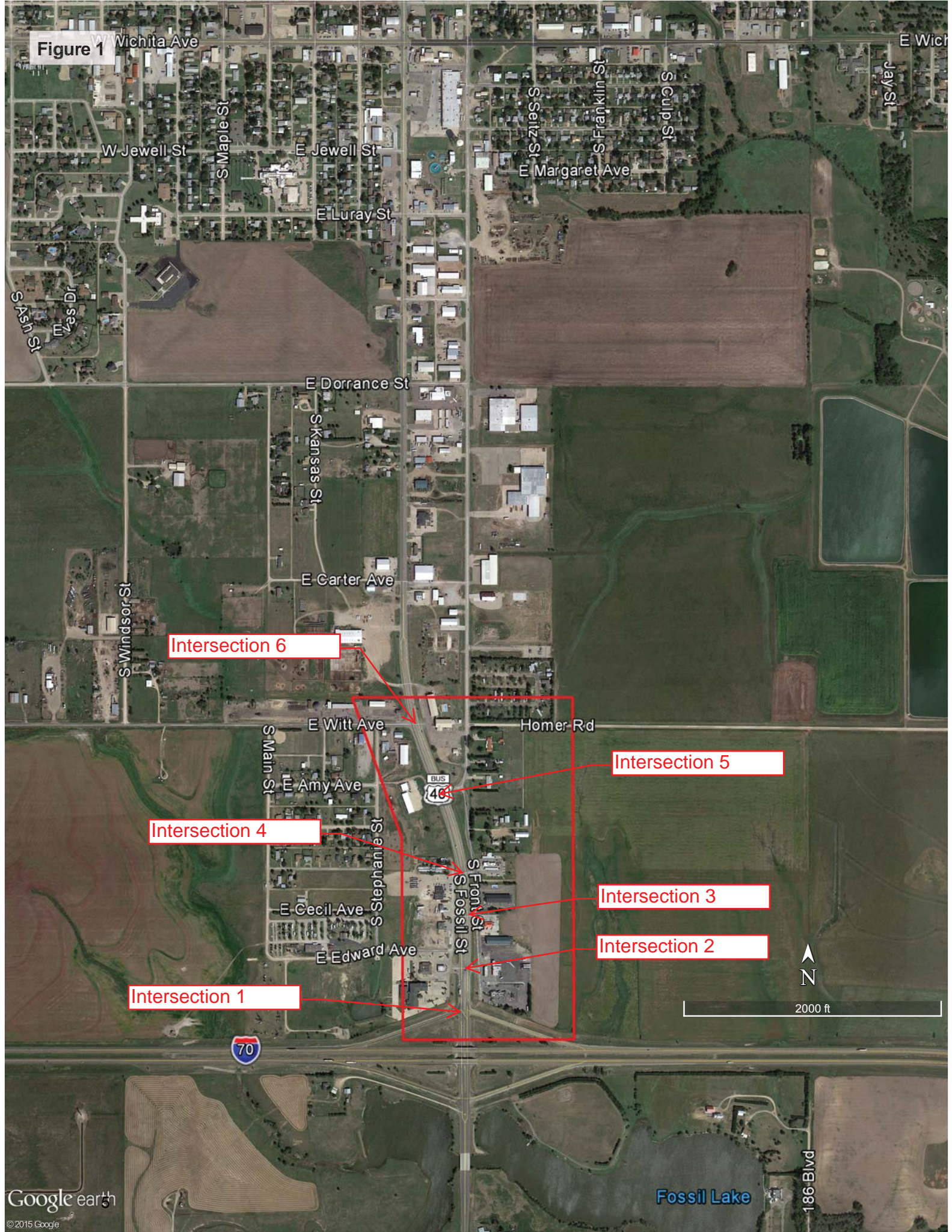
- Background traffic growth projections at the I-70 westbound on/off ramps were provided by KDOT.
- Kirkham Michael performed AM, Midday, and PM peak traffic volume counts at six intersections along US-281 from the I-70 westbound on/off ramps to East Witt Avenue.
- Site generated trips – *ITE Trip Generation Manual, 9<sup>th</sup> Edition, 2012*.
- Signal Warrant Analysis – *Manual of Uniform Traffic Devices, MUTCD 2009 Edition, Revision 2, effective March, 26, 2014*.
- Pass-by Trips – *ITE Trip Generation Handbook, an ITE Recommended Practice, March 2001*

### 1.3 Overview of Study Approach

To achieve the main goal of the study, the following tasks were accomplished:

- A site visit to observe the current lane configurations and geometry.
- Traffic counts were conducted as previously described in Data Gathering.
- A meeting was held with KDOT, the City of Russell, and one business owner to discuss possible future development.
- A roadway layout considering possible development was created.
- Proposed site development plan data was processed.
- Growth factors and crash data were obtained from KDOT.
- Background volumes were projected for 2025 and 2035 (design year).
- Pass-by trips were generated for possible development.
- Diverted-link trips were generated for the possible development.
- Primary trips were generated for possible development.
- Background volumes were adjusted for pass-by and primary trips.
- Determined 2015 and 2035 intersection capacities using Synchro Version 8.
- A traffic signal warrant analysis was completed.
- Recommendations for roadway and traffic control improvements was developed.

Figure 1



Intersection 6

Intersection 5

Intersection 4

Intersection 3

Intersection 2

Intersection 1



2000 ft

## EXISTING ROADWAY NETWORK CONDITIONS

Highway 281 is a four-lane, divided highway with frontage roads on both sides that connect to the local businesses. In the 0.5 mile stretch of the study area, there are six intersections, four of which connect directly to these frontage roads. Because of the close proximity of these accesses, it was proposed at the kickoff meeting that Intersection 3 (across from Pizza Hut) be converted to a right-in, right-out access. The lane layout for the study area is shown in Figure 2.

Traffic counts (see Appendix) were taken at six different intersections at consecutive 15-minute intervals during three periods; 6:30 – 9:30 AM, 11:30 AM – 1:30 PM, and 3:30 – 6:30 PM, for a total of 8 hours. These three times were taken to gather information during the three peak hours during a typical day. After reviewing the data gathered, it was determined that the highest weekday peak hourly volume occurs from 4:45 to 5:45 PM. These volumes represent the critical peak hourly volume used for this analysis and can be seen in Figure 3. The Lodge at Russell (east of Intersection 6) was recently under renovations, however, it was open during traffic counts and the volumes at this intersection were determined to be accurate.

Analysis of the existing PM peak hour volumes was performed using Synchro 8.0. The worst level-of-service (LOS) was westbound traffic at Intersection 2 (E. Edwards Avenue) which had a LOS of “C”. LOS is a measure of effectiveness for intersection operating conditions, and is based on delay experienced by vehicles passing through an intersection. It can range from LOS “A” to LOS “F”, with LOS “A” representing little or no delay. A LOS “C” or better is considered desirable. The following Table 1 shows the intersection LOS Criteria for both signalized and unsignalized intersections. The existing LOS can be seen in Figure 4 and Table 2.

**TABLE 1 – Intersection LOS Criteria**

Level of Service	Signalized Control Delay Range	Unsignalized Control Delay Range
A	≤10 seconds	≤10 seconds
B	>10 and ≤20 seconds	>10 and ≤15 seconds
C	>20 and ≤35 seconds	>15 and ≤25 seconds
D	>35 and ≤55 seconds	>25 and ≤35 seconds
E	>55 and ≤80 seconds	>35 and ≤50 seconds
F	>80 seconds	>50 seconds



## 2.1 Crash Analysis

A crash analysis and crash reports were supplied by KDOT detailing the crashes within the study area. The analysis showed a five-year crash rate of 1.514 per million miles of vehicle travel for Highway 281. The statewide overall crash rate for a similar type roadway is 0.676 per million miles of vehicle travel. With a crash rate of nearly twice the statewide average, additional review of the crash data was conducted.

Of the 13 reported crashes in the five-year period, four were near the intersection with Edward Avenue (Intersection 2). One of these was due to no headlights at night. The other three were failure to yield crashes where the drivers did not stay at the stop sign on the minor road until the major road was clear. There are no sight-distance or stopping sight-distance issues at this intersection. Four of the other crashes were located at the I-70 on and off ramps (Intersection 1). One of these was weather related, two others were failure to yield, and the fourth was due to a high rate of speed.

A signal warrant analysis was conducted using MUTCD Warrant 7 – Crash Experience. The warrant requirement for a signal, is five or more reported crashes within a 12-month period. Since there were only four reported collision crashes at both of these intersections within the five-year period, a signal is not warranted at these intersections. There is also a minimum volume requirement for Warrant 7 which is the 70% column from Table 4C-1 (see Appendix) of signal Warrant 1 from the MUTCD. This volume is not met with existing traffic volumes. A signal may be warranted if the potential development occurs and /or the rate of crashes increases.

It is, however, recommended that the intersection with Edwards Avenue (Intersection 2) be realigned and Intersection 3 be converted to a right-in, right-out intersection in the near future to increase the distance between full access intersections. Intersections with limited distance between them have the potential to increase the probability of crashes.

## 2.2 Pedestrian Movements

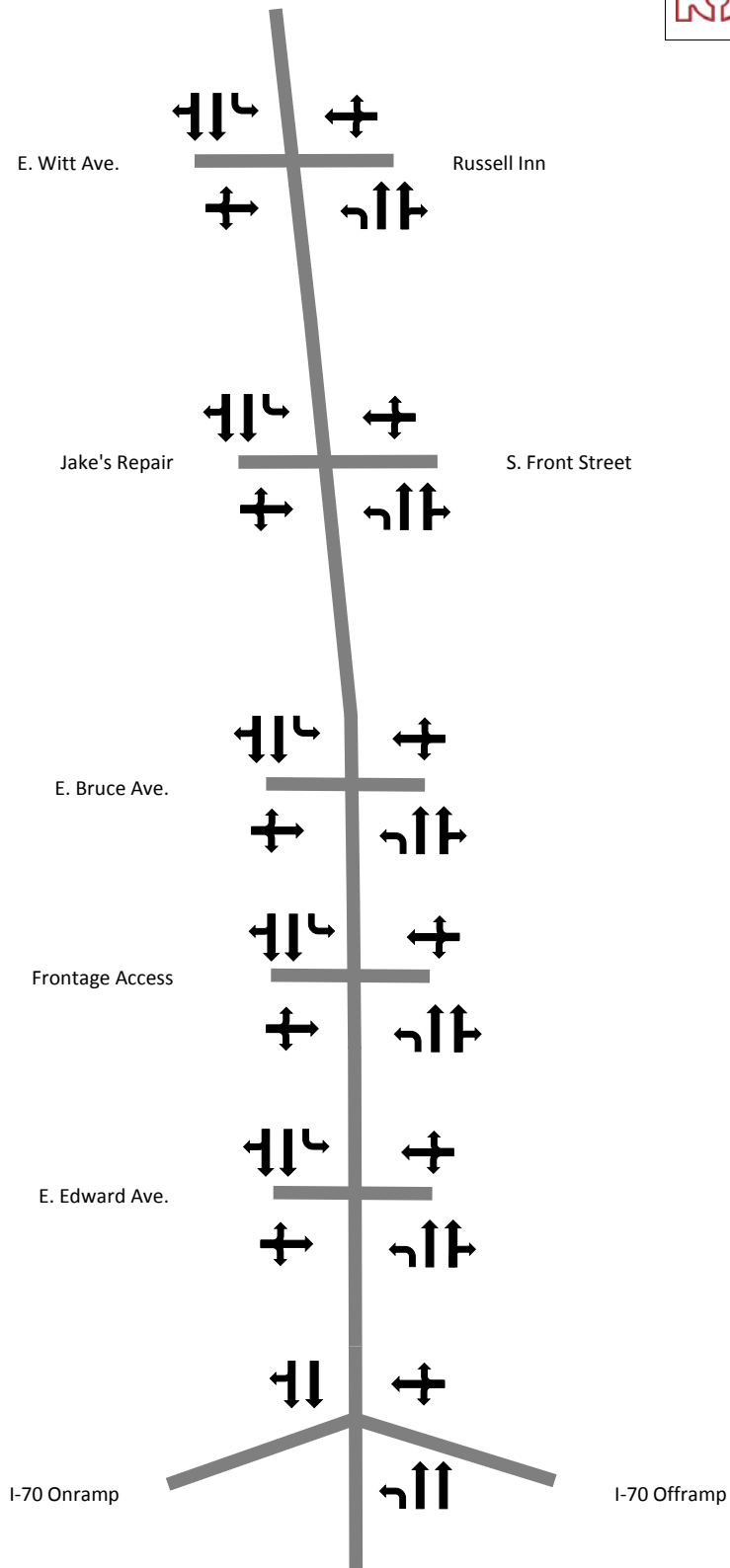
The City of Russell has expressed concern about pedestrians crossing Highway 281 near Intersection 2 to patronize restaurants on the opposite side from where they parked. Currently, there are no sidewalks or pedestrian crossings on either side of the highway. Because of this, pedestrians cross at random points and there are no median refuges for them on a very wide section of road.

It is recommended that sidewalks be constructed along both of the Highway 281 frontage roads. Marked pedestrian crosswalks should also be constructed at Intersection 2 with the proposed intersection improvements and also at Intersection 4 (see Figure 7). This will provide specific locations for pedestrians to cross Highway 281 and will make drivers more aware that pedestrians may be present.

The existing pedestrian volumes are very low in this area as seen in the traffic counts (see Appendix). However, if development does occur along this corridor, pedestrian volumes can be expected to increase. As such, if signal warrants are met at Intersection 2 in the future, pedestrian signalization should be incorporated. If development does not occur, pedestrian infrastructure would not be warranted.

Figure 2

US-281 - Existing Lane Layout



Not to Scale

Figure 3

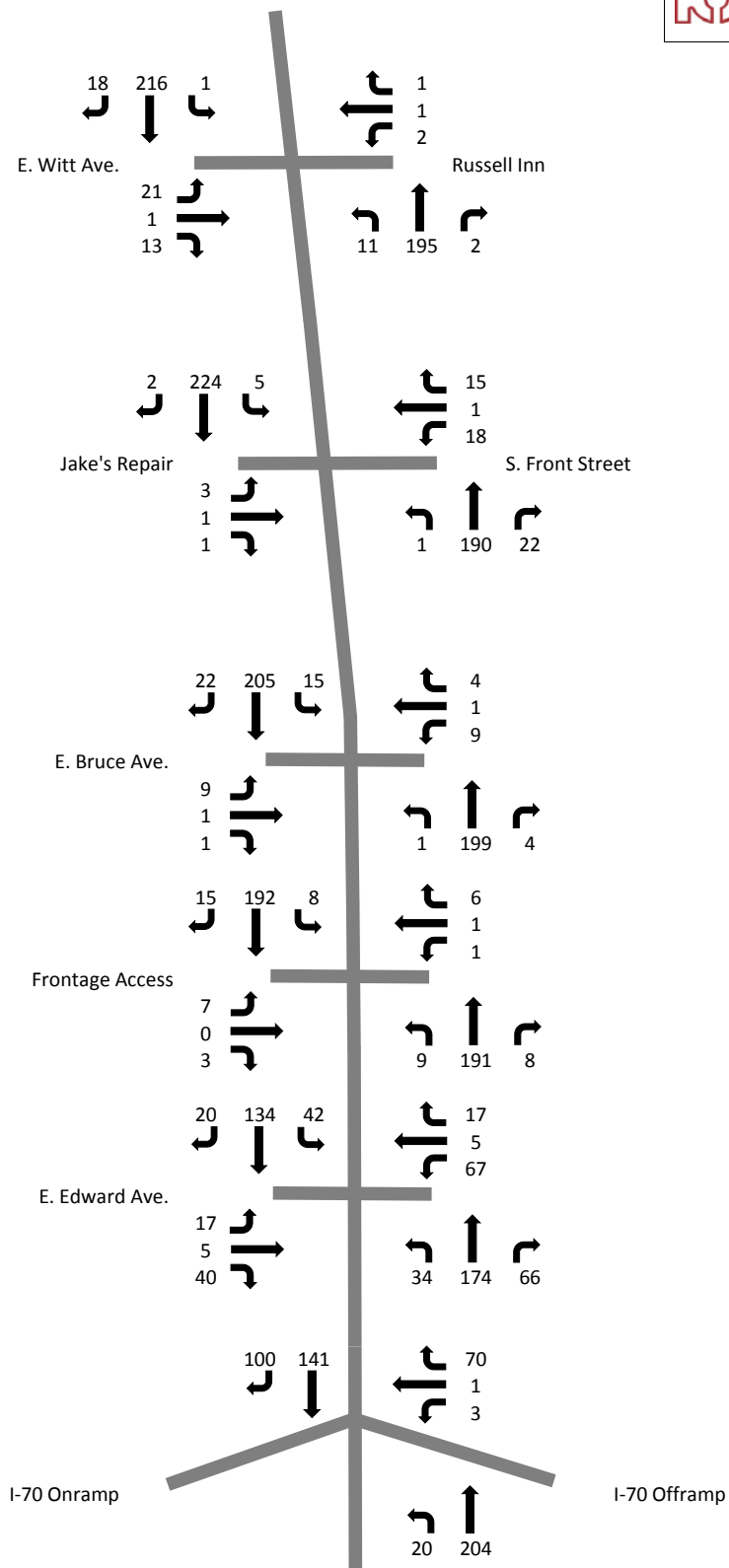
US-281 - 2015 Traffic Volumes - PM Peak Hour



↓ 235  
46%    ↑ 217  
47%



Not to Scale



↓ 241  
53%    ↑ 274  
54%

Figure 4

US-281 - 2015 Level of Service - PM Peak Hour

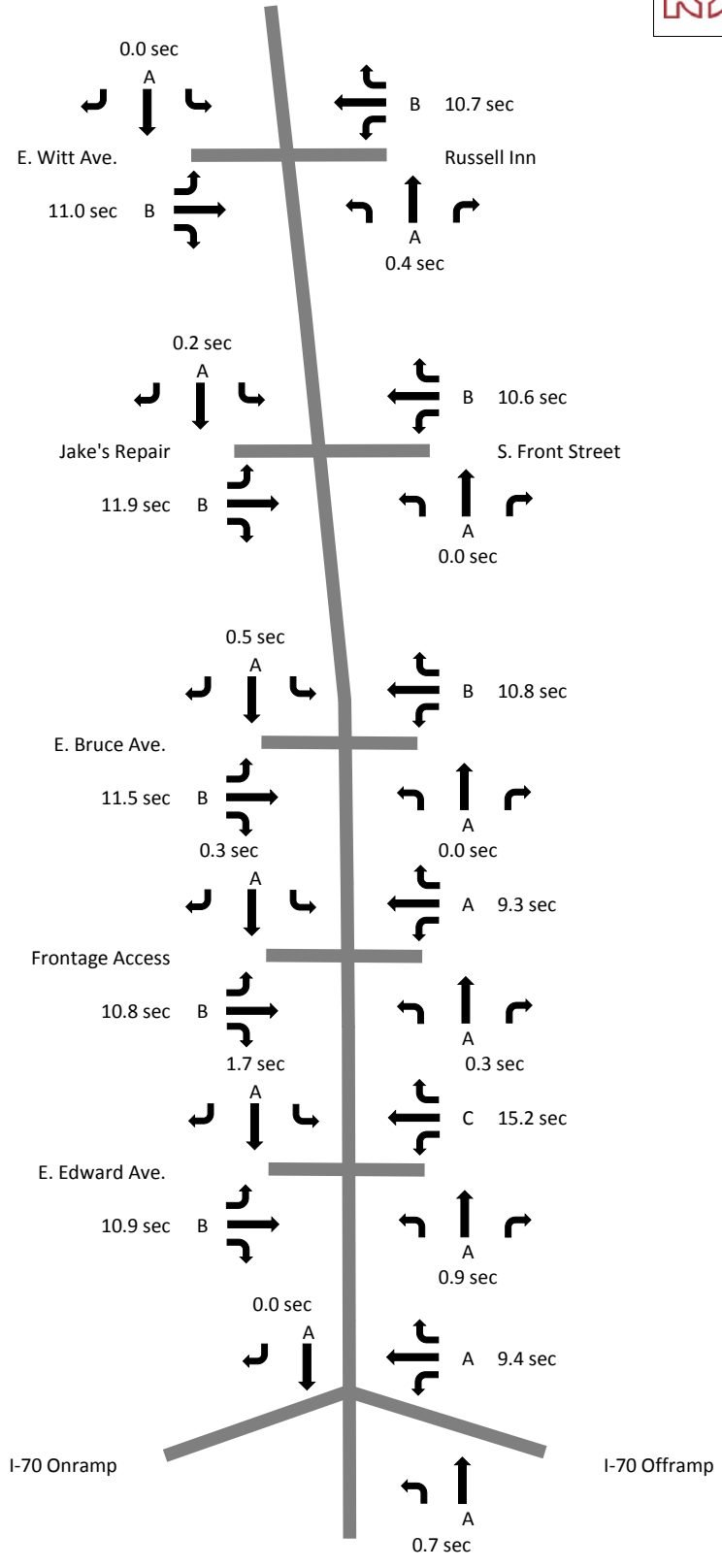


Table 2

2015 - Level of Service, Delay, & Queue Length							
Leg	Level of Service	Delay (sec.)	Queue Length (ft)	Leg	Level of Service	Delay (sec.)	Queue Length (ft)
Intersection 1 - I-70 Ramps				Intersection 4 - E. Bruce Ave.			
EBL	-	-	-	EBL	B	11.5	1
EBT	-	-	-	EBT	B	11.5	1
EBR	-	-	-	EBR	B	11.5	1
WBL	A	9.4	7	WBL	B	10.8	2
WBT	A	9.4	7	WBT	B	10.8	2
WBR	A	9.4	7	WBR	B	10.8	2
NBL	A	7.8	1	NBL	A	7.7	0
NBT	A	0.0	0	NBT	A	0.0	0
NBR	-	-	-	NBR	A	0.0	0
SBL	-	-	-	SBL	A	7.7	1
SBT	A	0.0	0	SBT	A	0.0	0
SBR	A	0.0	0	SBR	A	0.0	0
Intersection 2 - E. Edward Ave.				Intersection 5 - S. Front St.			
EBL	B	10.9	8	EBL	B	11.9	1
EBT	B	10.9	8	EBT	B	11.9	1
EBR	B	10.9	8	EBR	B	11.9	1
WBL	C	15.2	20	WBL	B	10.6	4
WBT	C	15.2	20	WBT	B	10.6	4
WBR	C	15.2	20	WBR	B	10.6	4
NBL	A	7.60	2	NBL	A	0.0	0
NBT	A	0.00	0	NBT	A	0.0	0
NBR	A	0.00	0	NBR	A	0.0	0
SBL	A	7.9	3	SBL	A	7.7	0
SBT	A	0.0	0	SBT	A	0.0	0
SBR	A	0.0	0	SBR	A	0.0	0
Intersection 3 - Frontage Access				Intersection 6 - E. Witt Ave.			
EBL	B	10.8	1	EBL	B	11	5
EBT	B	10.8	1	EBT	B	11	5
EBR	B	10.8	1	EBR	B	11	5
WBL	A	9.3	1	WBL	B	10.7	0
WBT	A	9.3	1	WBT	B	10.7	0
WBR	A	9.3	1	WBR	B	10.7	0
NBL	A	7.3	1	NBL	A	7.8	1
NBT	A	0.0	0	NBT	A	0.0	0
NBR	A	0.0	0	NBR	A	0.0	0
SBL	A	7.7	0	SBL	A	7.7	0
SBT	A	0.0	0	SBT	A	0.0	0
SBR	A	0.0	0	SBR	A	0.0	0

## FUTURE CONDITIONS

A linear growth factor was applied to the 2015 PM peak hour traffic counts to determine the 2025 and 2035 forecasted background traffic volumes. Based on a traffic forecast for the intersection of Highway 281 and the I-70 off-ramp and on-ramp, it was determined that an annual growth factor of 1% would be applied. These forecast volumes can be seen in Table 3 and the 2035 volumes can be seen in Figure 5. Analysis of the 2035 PM peak hour volumes through Synchro determined the LOS for each intersection which can be seen in Figure 6 and Table 4. The LOS shown, represents a situation where traffic volumes have grown but no development has occurred.

A proposed roadway improvement layout was developed based off of the discussion at the kickoff meeting and can be seen in Figure 7. Intersection 2 (Edward Avenue) would be realigned to connect with a new road on the east side of Highway 281 and left-turn lanes would be added for eastbound and westbound traffic. Intersection 3 would be converted into a right-in, right-out access. Bruce Avenue (Intersection 4) would be extended from the west to connect with Highway 281 and it would continue east between the Sonic and Days Inn Motel. Intersection 5 would be realigned and extended to the east. All of the roads extended east of the frontage road would connect to a new North-South road where the new commercial development would be located. There are no recommended changes to Intersection 1 and Intersection 6.

The roadway improvement layout was used to determine the potential trips generated by the commercial development. Two commercial lots and ten single family residential houses were also added to the west of Highway 281 where open lots currently exist.

Development Standard trip generation rates, as published in the ITE Trip Generation Manual, 9<sup>th</sup> Edition, were used to estimate the vehicle trips generated by the anticipated development. These rates, as well as the Average Daily Traffic (ADT) and PM Peak Hour volumes generated, can be seen in Table 5.

The PM peak hour trips generated were distributed into four categories: Internal Trips, Pass-by Trips, Diverted-Link Trips and Primary Trips.

Internal Trips refer to any vehicle that makes more than one stop within the system. An example of this within our study would be a vehicle that stops at the 24/7 Store and then stops at the Pizza Hut via the frontage road. Since it did not travel along Highway 281 between destinations, it is considered an internal trip.

Pass-by trips are vehicles that are already in the traffic flow but are diverted due to the new development. Different sites attract trips at different rates and some sites do not attract pass-by trips at all. These rates can be seen in Table 6 under the “Percent Pass-by Trips” column. Pass-by trips will exit the roadway and stop at a site and then enter the roadway again heading in the same direction that they were previously heading.

Diverted-link trips are similar to pass-by trips in that they are in the flow of traffic and diverted due to the new development. However, these vehicles must use another roadway in order to access the development. An example of this within the study area would be vehicles that exit I-70 to access the development but must use Highway 281 in order to do so. These vehicles then turn back onto Highway 281 before reentering I-70. The diverted-link rates and volumes can be seen in Table 6 under “Diverted-Link Trips”.

Primary trips are new trips added to the study area as a direct result of a new development. These trips are made for the specific purpose of visiting one site and then they return to their origin. A home-to-office-to-home is one example of this. The last three columns of Table 6 show the primary trips generated by the development.

Traffic distribution was used to determine the existing traffic patterns. These patterns were then used to assign pass-by, diverted-link, and primary trips. Figures 8 – 9 show the PM peak hour pass-by trips distributed onto each intersection and the pass-by trips added to the 2035 background PM peak hour volume. Figure 10 shows the PM Peak hour diverted-link trips distributed on each intersection. Figures 11 – 12 show the 2035 traffic patterns within the study area for both vehicles turning east and vehicles turning west. These patterns were then applied to the primary trips from Table 6 and combined in Figure 13 which shows all of the primary trips generated by the development.

The total PM peak hour volume with the development-generated trips is shown in Figure 14. These volumes were analyzed using Synchro and the LOS and segment delay are shown in Figure 15 and Table 7. Most of the intersections in the study area will be operating at desirable levels during the 20-year PM peak hour forecast. However, eastbound and westbound traffic at Intersection 2 (Edwards Avenue) will be operating at a LOS “D” and “F” respectively. Westbound traffic at this intersection would have delays up to 564 seconds which is well beyond the beginning criteria of 50 seconds for LOS “F”.



Due to the heavy right-turn movements at Intersection 2, it was analyzed to see if it met warrants for a right-turn lane or right-turn deceleration taper. The directional design hourly volume (DDHV) for northbound traffic is approximately 590 vph and the speed limit in this area is 45 mph. Table 4-26 in KDOT's Access Management Policy (see Appendix) states that a right-turn volume above 95 vph will warrant a right-turn lane and a volume 50 vph will warrant a right-turn deceleration taper. 2035 traffic projections show that the right-turn volume for northbound traffic at this location will reach approximately 90 vph and 210 vph without and with development respectively. These volumes will meet the warrants for both a right-turn taper and a right-turn lane. The turn lane length at this location would not be ideal and would be less than KDOT's required turn lane lengths, but it is recommended to use all of the space that is available for a right-turn lane.

### **Left-turn Bay Length**

The existing corridor of Highway 281 from I-70 to East Witt Avenue is typical of other Kansas communities located along the I-70 corridor, such as Hays, Colby, Abilene, and WaKeeney, Kansas. The typical aspects of these communities is that development has taken place to serve the needs of the traveling public using the I-70 interstate. Such uses include mainly gas stations and truck stops with convenience stores, hospitality industry, fast food and sit-down restaurants. The sites were developed along the north-south corridor along the state highway, in this case Highway 281. All these sites have full access to Highway 281. The close proximity of access point features short left turn lanes that do not include the deceleration length, within the left-turn bay, that is required in KDOT's current Access Management Policy. Despite this, the corridor currently operates at desired levels of service with minimal impacts to the traveling public. This is not expected to change as traffic volumes on Highway 281 increase over the 20-year time period of this study. Additionally, new intersections are not proposed, but only slight realignment of existing intersections.

Some of the intersections along the commercial corridors were signalized in other similar communities, at intervals closer than the minimum 2,640 feet (half mile) specified in the KDOT Access Management Policy.

## **Signal Warrant Analysis**

A traffic signal at Intersection 2 (Edward Avenue) may be warranted, in the distant future, if built-out conditions as described in this analysis materialize. Before a decision to place a signal at this intersection is made, an update to this analysis will be required to verify the traffic conditions at that time. It needs to be emphasized, that considering the traffic volume projections of this study, the intersection of the I-70 on and off ramps with Highway 281 will not meet signal warrants, even at build-out scenario. This condition will help with the potential installation of a signal at Edwards Avenue, since it will be the only signal warranted on this corridor.

If the full development occurs, in 2035, Highway 281 would have an eight-hour vehicular volume of approximately 940 vph and the higher of the east/west leg would have an eight-hour volume of approximately 260 vph. These volumes both exceed the volumes in the Warrant 1 – Eight-hour Vehicular Volume table (see Appendix). These volumes will only meet warrants if the anticipated development occurs. Figure 16 and Table 8 show the LOS and segment delay for the corridor with a signalized Intersection 2.

The KDOT Access Management Policy requires 2,640 feet (1/2 mile) separation between an interchange and a full access intersection which is located on a four-lane highway. Signalizing Intersection 2 would conflict with this policy as there is only about 300 feet between the westbound I-70 interchange ramps and Edward Avenue. The current and projected traffic volumes of the I-70 interchange suggest that it is unlikely to be signalized in the foreseeable future.

It is recommended to signalize Intersection 2 (Edward Avenue) once the signal warrants are met. This recommendation is made considering the heavy eastbound and westbound traffic volume of Intersection 2, and despite the contradiction to the KDOT Access Management Policy. Traffic volumes will need to be monitored even after development occurs to confirm that signal warrants are met. If signal warrants are not met, it is not recommended that this intersection be signalized due to the contradictions to the KDOT Access Management Policy.

Table 3

## Traffic Volume Forecasts

## Intersection 1 - I-70 On/Off-Ramps

## Peak Hour Forecasts

	Eastbound			Westbound			Northbound			Southbound			Total
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
2015	-	-	-	70	1	3	-	204	20	100	141	-	539
2025	-	-	-	77	1	3	-	224	22	110	155	-	592
2035	-	-	-	92	1	4	-	269	26	132	186	-	710

## Intersection 2 - E. Edward Ave.

## Peak Hour Forecasts

	Eastbound			Westbound			Northbound			Southbound			Total
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
2015	40	5	17	17	5	67	66	174	34	20	134	42	621
2025	44	6	19	19	6	74	73	191	37	22	147	46	684
2035	53	7	23	23	7	89	88	229	44	26	176	55	820

## Intersection 3 - Access Rd.

## Peak Hour Forecasts

	Eastbound			Westbound			Northbound			Southbound			Total
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
2015	3	1	7	6	1	1	8	191	9	15	192	8	442
2025	3	1	8	7	1	1	9	210	10	17	211	9	487
2035	4	1	10	8	1	1	11	252	12	20	253	11	584

## Intersection 4 - E. Bruce Ave.

## Peak Hour Forecasts

	Eastbound			Westbound			Northbound			Southbound			Total
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
2015	1	1	9	4	1	9	4	199	1	22	205	15	471
2025	1	1	10	4	1	10	4	219	1	24	226	17	518
2035	1	1	12	5	1	12	5	263	1	29	271	20	621

## Intersection 5 - S. Front St.

## Peak Hour Forecasts

	Eastbound			Westbound			Northbound			Southbound			Total
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
2015	1	1	3	15	1	18	22	190	1	2	224	5	483
2025	1	1	3	17	1	20	24	209	1	2	246	6	531
2035	1	1	4	20	1	24	29	251	1	2	295	7	636

## Intersection 6 - E. Witt Ave.

## Peak Hour Forecasts

	Eastbound			Westbound			Northbound			Southbound			Total
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
2015	13	1	21	1	1	2	2	195	11	18	216	1	482
2025	14	1	23	1	1	2	2	215	12	20	238	1	530
2035	17	1	28	1	1	2	2	258	14	24	286	1	635

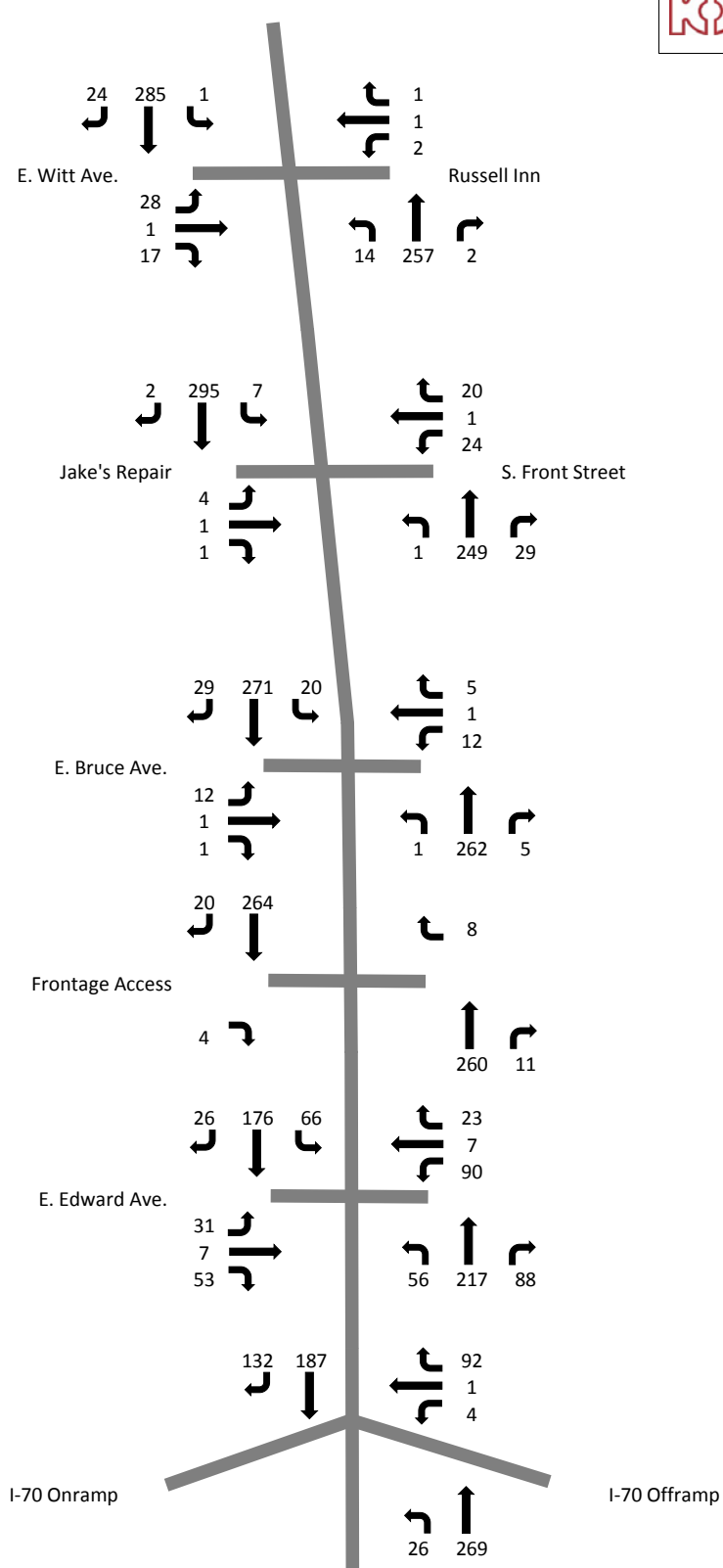
Figure 5

US-281 - 2035 Background Traffic - PM Peak Hour

\*1% Annual Growth with No Development



↓ 310  
46%    ↑ 286  
47%



↓ 319  
53%    ↑ 361  
54%

Figure 6

US-281 - 2035 Level of Service - PM Peak Hour

\*LOS Without Development but with Recommended Improvements

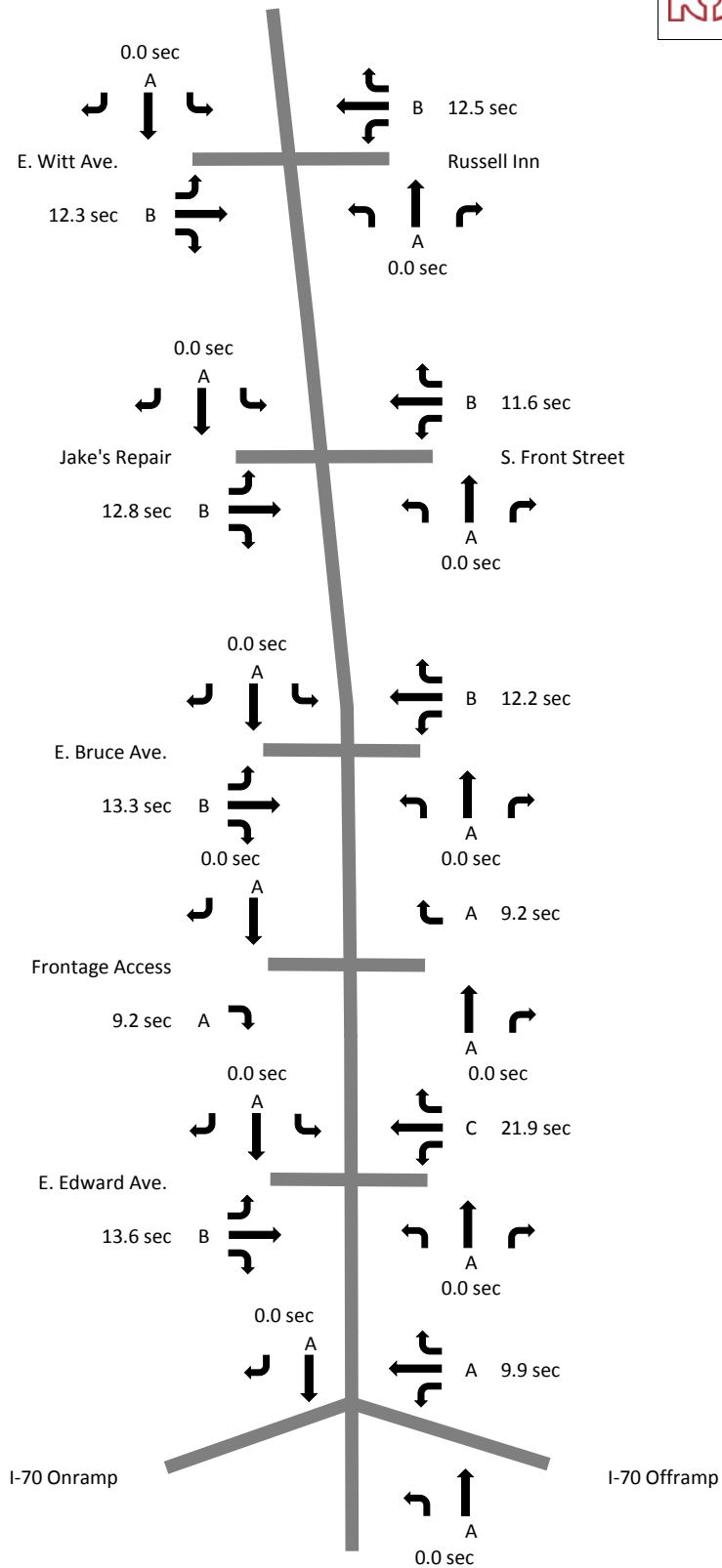


Table 4

2035 without Development - Level of Service, Delay, & Queue Length							
Leg	Level of Service	Delay (sec.)	Queue Length (ft)	Leg	Level of Service	Delay (sec.)	Queue Length (ft)
Intersection 1 - I-70 Ramps				Intersection 4 - E. Bruce Ave.			
EBL	-	-	-	EBL	B	13.5	3
EBT	-	-	-	EBT	B	13.5	3
EBR	-	-	-	EBR	B	13.5	3
WBL	B	10.2	11	WBL	B	12.3	3
WBT	B	10.2	11	WBT	B	12.3	3
WBR	B	10.2	11	WBR	B	12.3	3
NBL	A	8.2	2	NBL	A	8.8	0
NBT	A	0.0	0	NBT	A	0.0	0
NBR	-	-	-	NBR	A	0.0	0
SBL	-	-	-	SBL	A	7.9	1
SBT	A	0.0	0	SBT	A	0.0	0
SBR	A	0.0	0	SBR	A	0.0	0
Intersection 2 - E. Edward Ave.				Intersection 5 - S. Front St.			
EBL	C	17.4	9	EBL	B	12.8	1
EBT	B	10.6	8	EBT	B	12.8	1
EBR	B	10.6	8	EBR	B	12.8	1
WBL	D	25.5	39	WBL	B	12.3	7
WBT	B	12.5	5	WBT	B	12.3	7
WBR	B	12.5	5	WBR	B	12.3	7
NBL	A	8.10	4	NBL	A	7.9	0
NBT	A	0.00	0	NBT	A	0.0	0
NBR	A	0.00	0	NBR	A	0.0	0
SBL	A	8.2	5	SBL	A	7.9	0
SBT	A	0.0	0	SBT	A	0.0	0
SBR	A	0.0	0	SBR	A	0.0	0
Intersection 3 - Frontage Access				Intersection 6 - E. Witt Ave.			
EBL	-	-	-	EBL	B	12.3	8
EBT	-	-	-	EBT	B	12.3	8
EBR	A	9.2	0	EBR	B	12.3	8
WBL	-	-	-	WBL	B	13.5	1
WBT	-	-	-	WBT	B	13.5	1
WBR	A	9.9	1	WBR	B	13.5	1
NBL	-	-	-	NBL	A	8.0	1
NBT	A	0.0	0	NBT	A	0.0	0
NBR	A	0.0	0	NBR	A	0.0	0
SBL	-	-	-	SBL	A	7.8	0
SBT	A	0.0	0	SBT	A	0.0	0
SBR	A	0.0	0	SBR	A	0.0	0

FIGURE 7



SCALE: 1"=200'



LEGEND





-  PAVEMENT REMOVAL
-  PROPOSED IMPROVEMENTS
-  PROPOSED SIDEWALK IMPROVEMENTS
-  PROPOSED PEDESTRIAN CROSSING



Table 5		Trips Generated from Development										
Lot	Land Use	ITE Code	Development Units	Quantity	Daily Rate	Daily Volume	PM Peak Rate	PM Peak Volume	PM Trip Distribution (Enter/Exit)		Enter	Exit
East of US-281												
Comm. 1	Fast-Food with Drive-Through	934	1000 GFA	5	496.12	2481	32.65	163	50%	50%	82	82
Comm. 2	Hotel	310	Occupied Rms	40	8.92	357	0.70	28	50%	50%	14	14
Comm. 3	High-Turnover Restaurant	932	1000 GFA	5	127.15	636	9.85	49	60%	40%	29	20
Comm. 4	Free-Standing Discount Store	815	1000 GFA	10	57.24	572	4.98	50	50%	50%	25	25
Comm. 5	Drive-In Bank	912	Employee	10	30.94	309	5.42	54	45%	55%	24	30
Comm. 6	Drugstore with Drive-Through	881	1000 GFA	15	96.91	1454	9.91	149	50%	50%	75	75
Comm. 7	Auto Care Center	942	1000 GFA	10		0	3.11	31	48%	52%	15	16
Comm. 8												
Comm. 9	Automated Car Wash	948	1000 GFA	5		0	14.12	71	50%	50%	36	36
Total						5809		595				
West of US-281												
Res. 1-10	Single-Family Detached House	210		10	9.52	95	1.00	10	60%	40%	6	4
Comm. 10	Coffee/Donut with Drive-Thru	937	1000 GFA	3	818.58	2456	42.8	128	50%	50%	64	64
Comm. 11	Fast-Food with Drive-Through	934	1000 GFA	4	496.12	1984	32.65	131	50%	50%	66	66
Total						4535		269				



Table 6

## PM Peak-Hour Pass-By, Diverted-Link, and Primary Trips

Lot	Land Use	ITE Code	Internal Trips (10%)	Percent Pass-By Trips	Pass-By Trips	Pass-By Trips (From North)	Pass-By-Trips (From South)	Percent Diverted Link	Diverted Link Trips	Diverted Link (From I-70)	Primary Trips	Primary Trips (From North)	Primary Trips (From South)
East of US-281													
Comm. 1	Fast-Food with Drive-Through	934	16	20%	15	7	8	30%	22	22	45	21	24
Comm. 2	Hotel	310	3	10%	1	0	1	15%	2	2	11	5	6
Comm. 3	High-Turnover Restaurant	932	5	18%	5	2	3	25%	7	7	17	8	9
Comm. 4	Free-Standing Discount Store	815	5	15%	3	1	2	20%	5	5	17	8	9
Comm. 5	Drive-In Bank	912	5	37%	8	4	4	10%	2	2	14	6	8
Comm. 6	Drugstore with Drive-Through	881	15	34%	23	11	12	15%	10	10	42	19	23
Comm. 7	Auto Care Center	942	3	23%	3	1	2	5%	1	1	11	5	6
Comm. 8													
Comm. 9	Automated Car Wash	948	7	27%	9	4	5	15%	5	5	22	10	12
Total			59		67	30	37		54	54	179	82	97
West of US-281													
Res. 1-10	Single-Family Detached House	210	1	0%	0	0	0	0%	0	0	6	3	3
Comm. 10	Coffee/Donut with Drive-Thru	937	13	30%	17	8	9	20%	12	12	35	16	19
Comm. 11	Fast-Food with Drive-Through	934	13	20%	12	6	6	30%	18	18	36	17	19
Total			27		29	14	15		30	30	77	36	41

Figure 8

US-281 - 2035 Pass-By Trip Distribution - PM Peak Hour

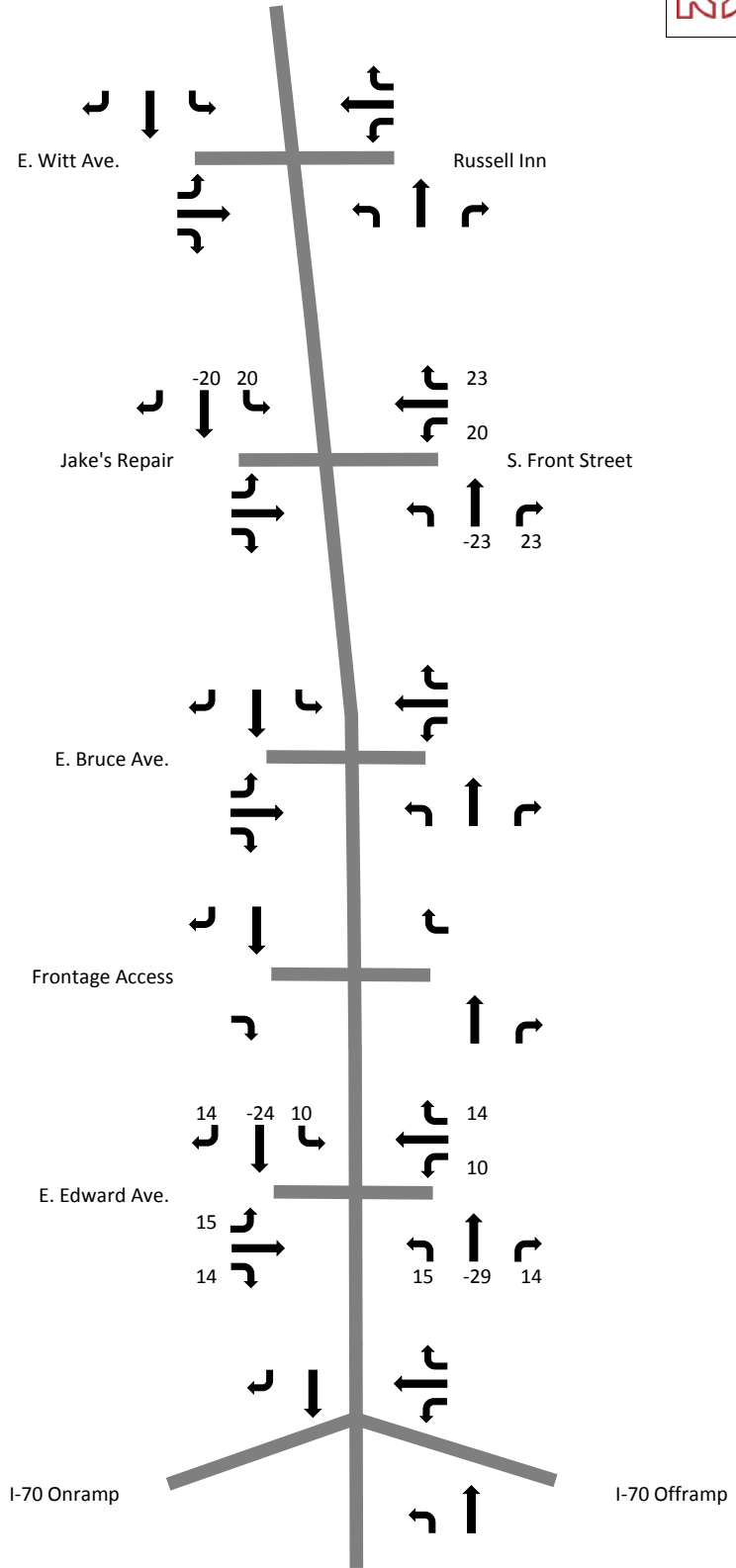
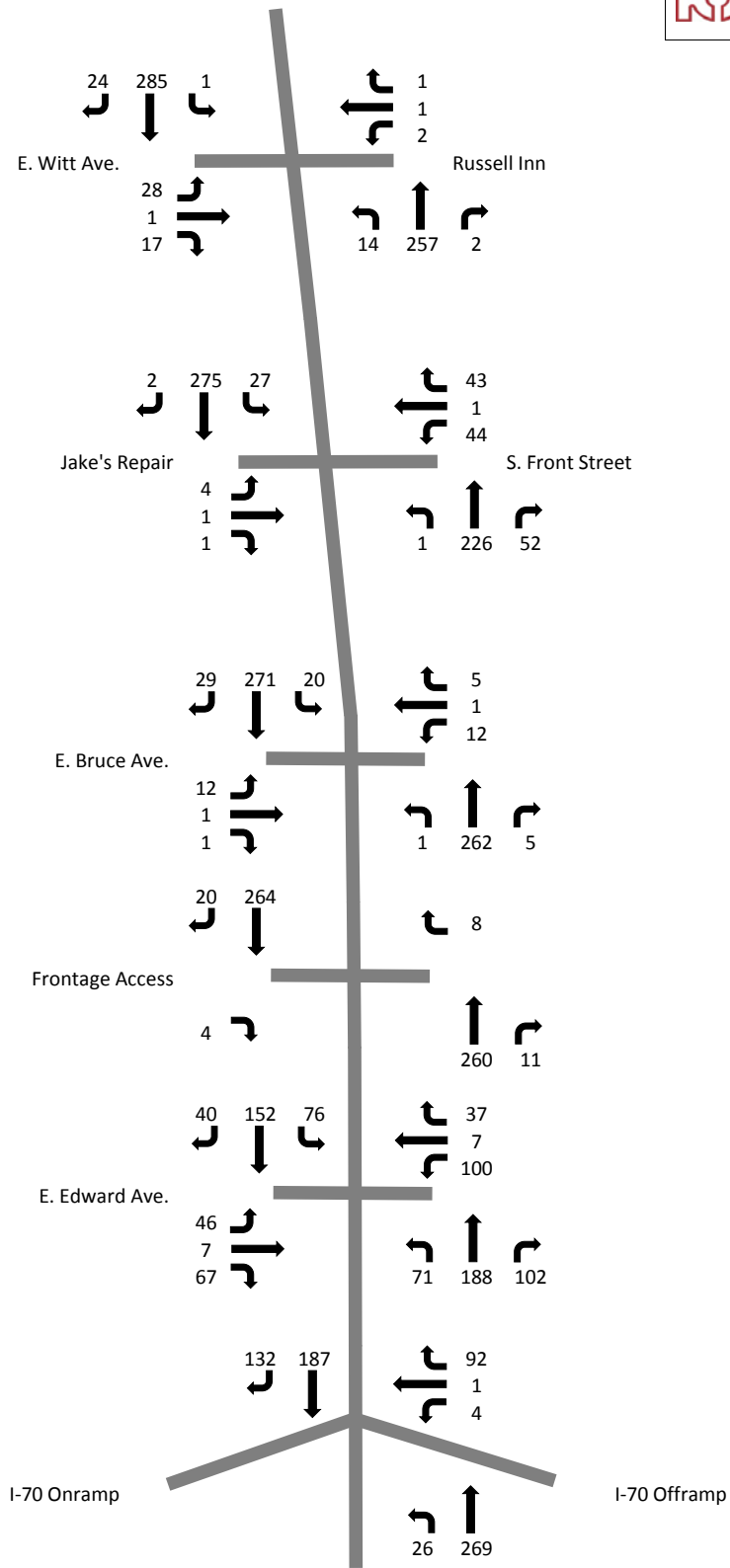


Figure 9

US-281 - 2035 Background with Pass-By Trips - PM Peak Hour

\*Combined Figures 4 & 5



Not to Scale

Figure 10

US-281 - 2035 Diverted-Link Distribution - PM Peak Hour

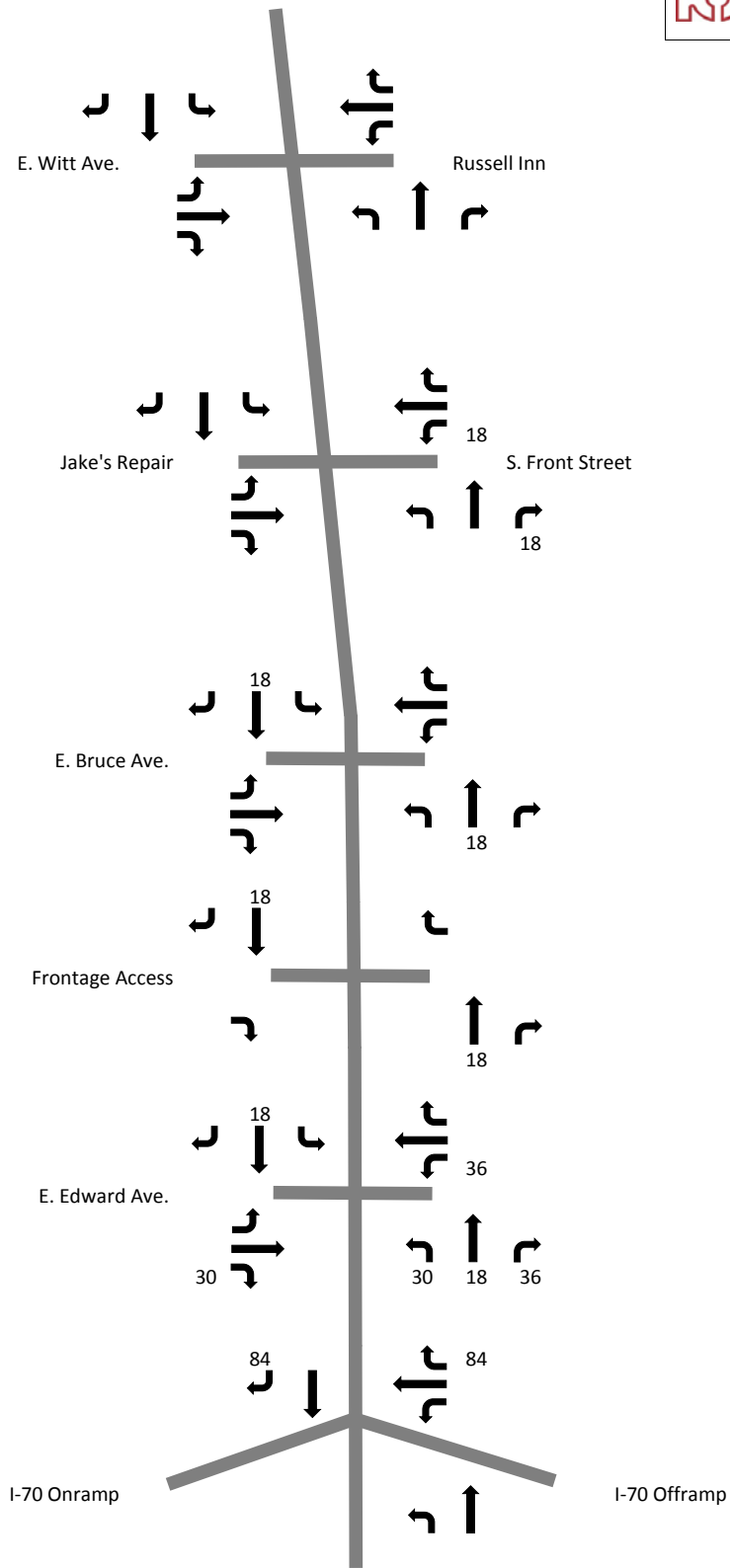


Figure 11

US-281 - 2035 Primary Trip Distribution East of US-281

\*Based on the Background Trip Distribution

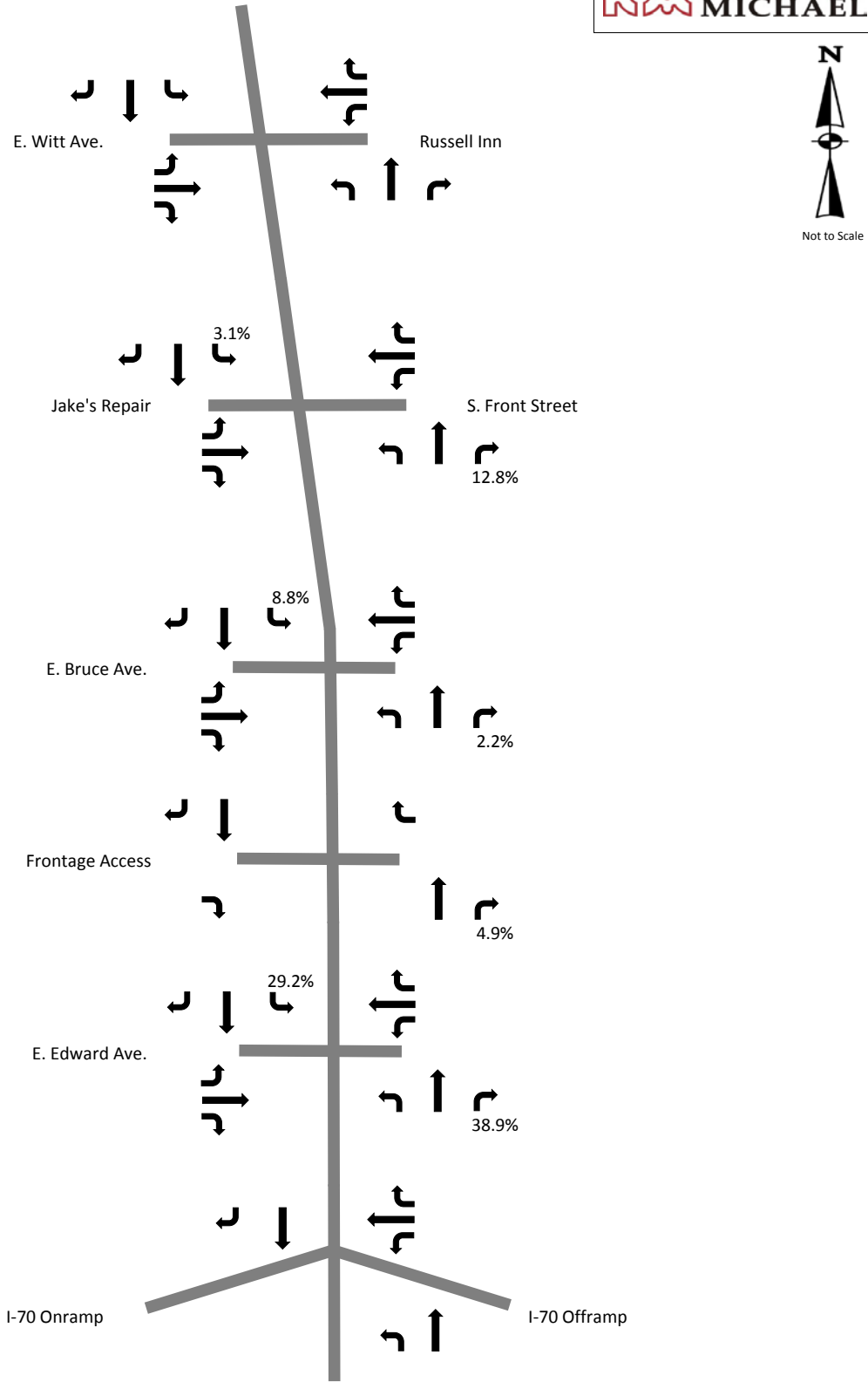


Figure 12

US-281 - 2035 Primary Trip Distribution West of US-281

\*Based on the Background Trip Distribution

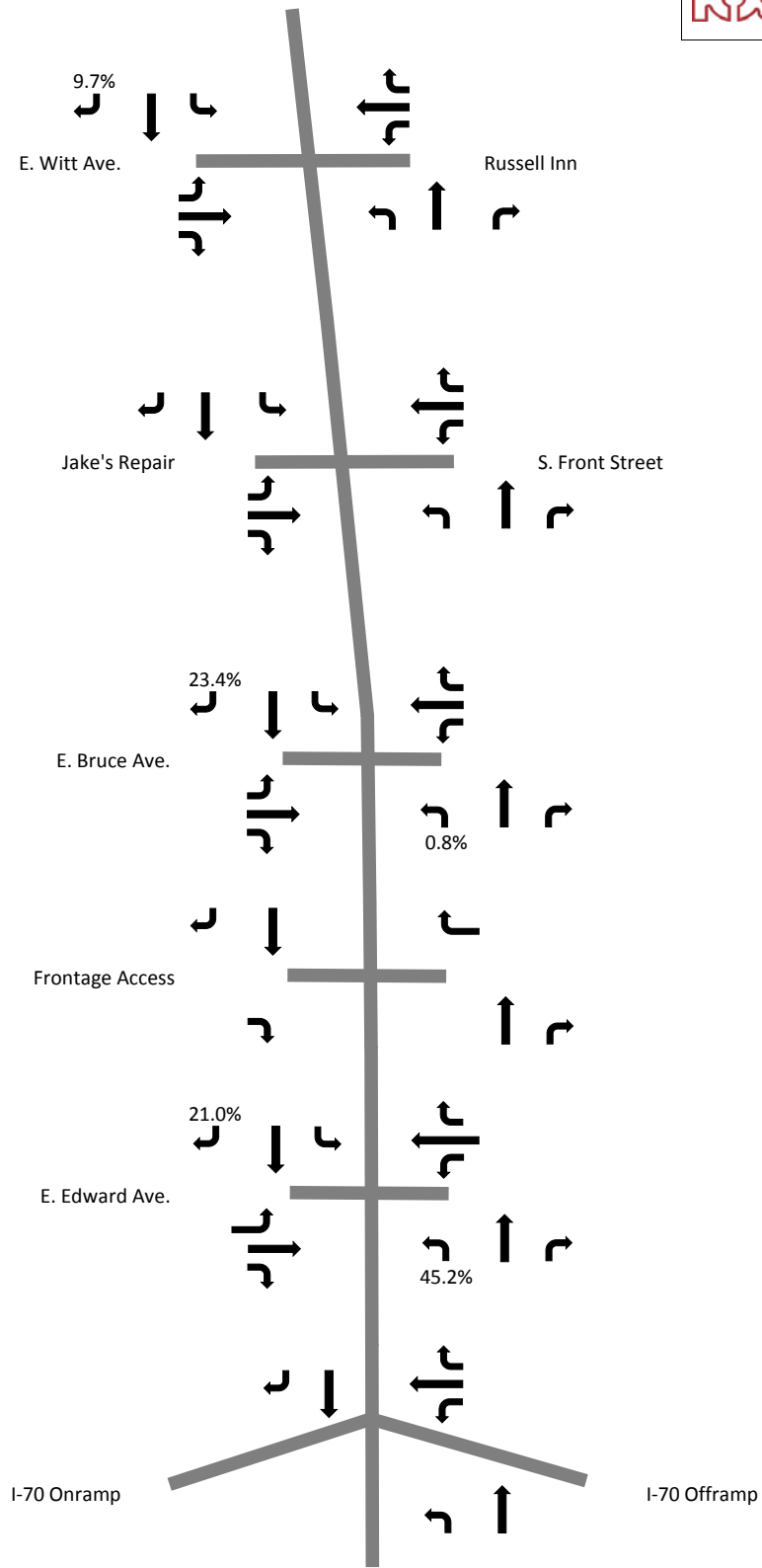


Figure 13

US-281 - 2035 Primary Trip - PM Peak Hour

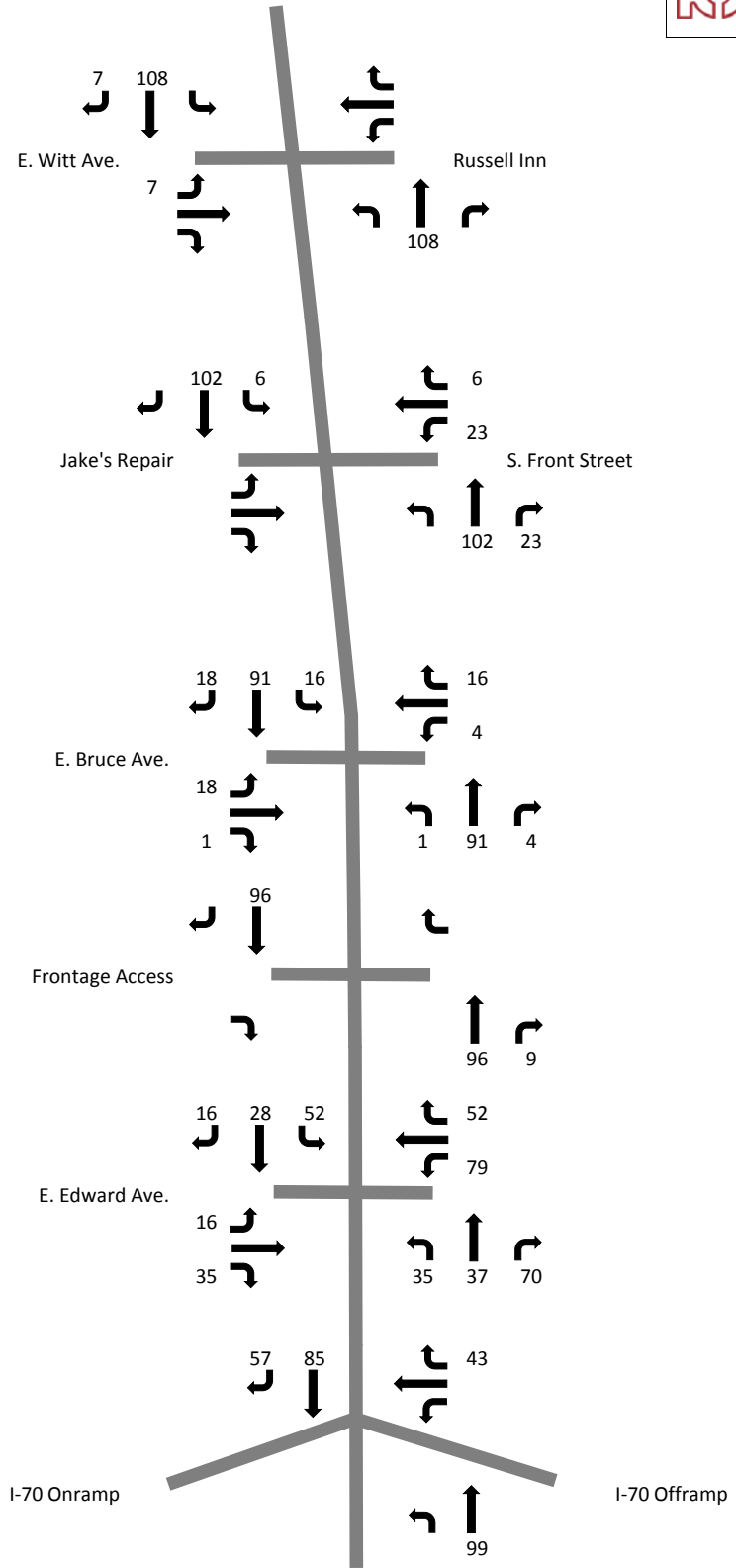


Figure 14

US-281 - 2035 Total Traffic Volume - PM Peak Hour

\*Combined Figures 5, 8, 10, & 13

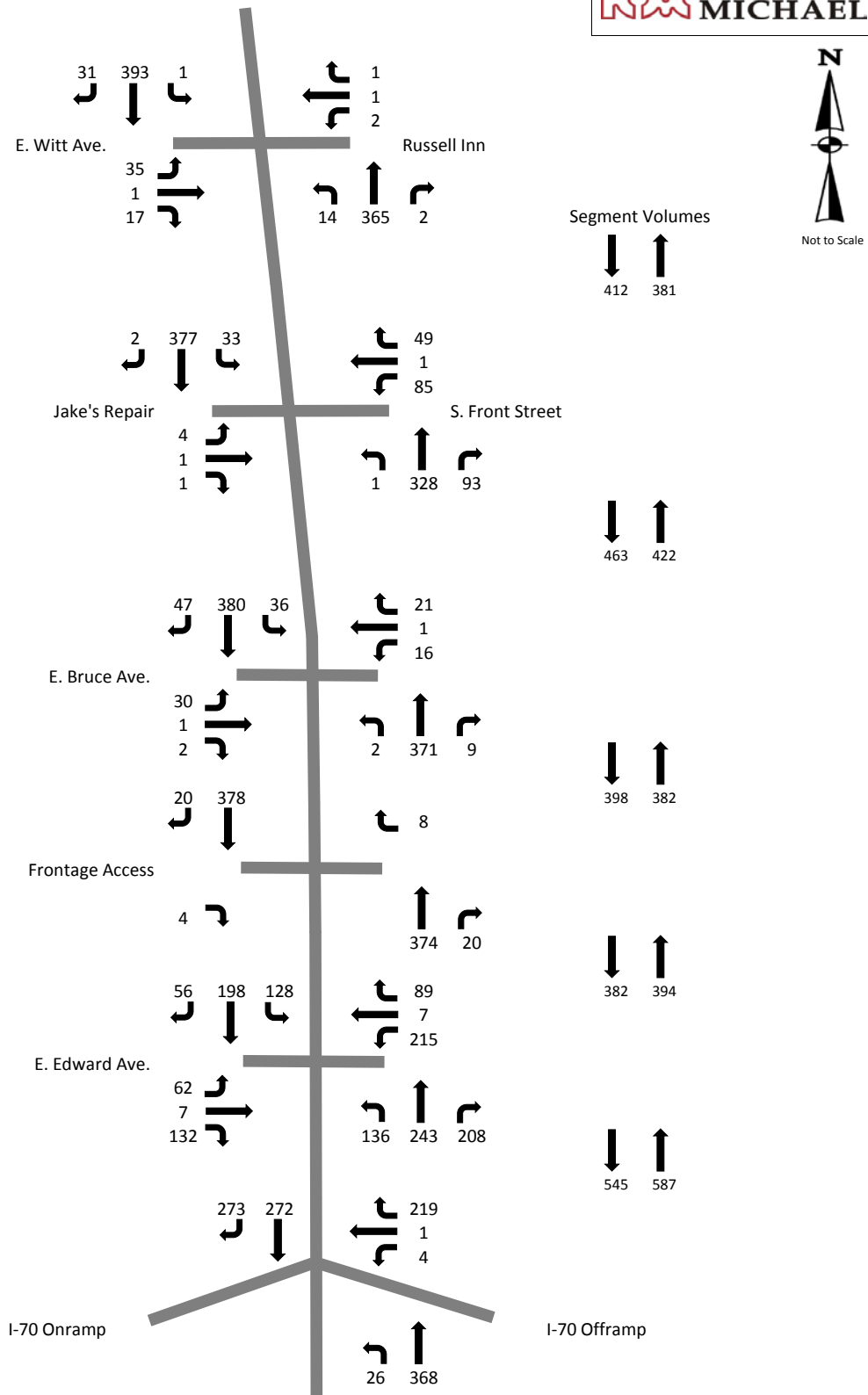




Figure 15

US-281 - 2035 Level of Service - PM Peak Hour

\*LOS With Development and Base Improvements

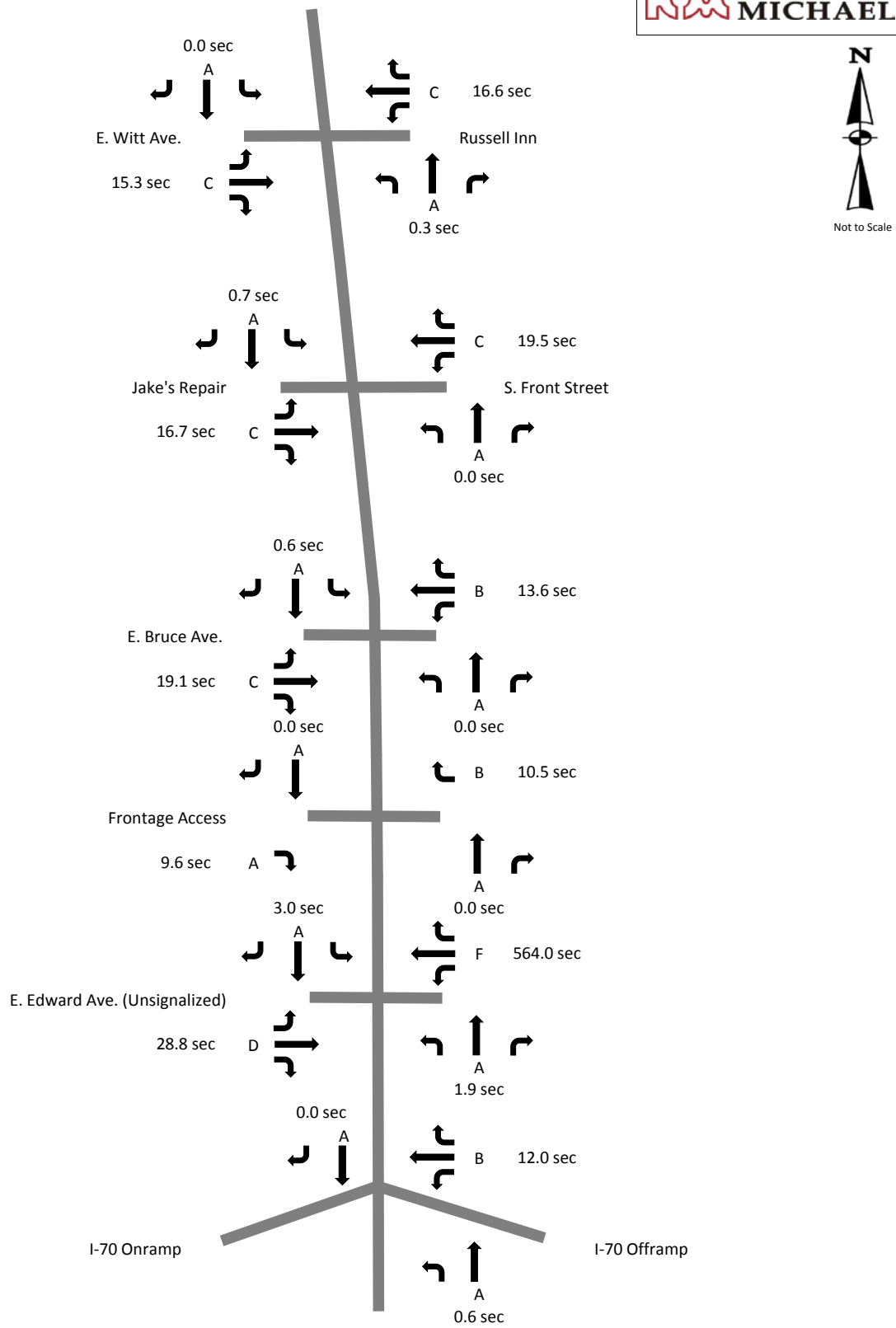


Table 7

2035 with Development - Level of Service, Delay, & Queue Length							
Leg	Level of Service	Delay (sec.)	Queue Length (ft)	Leg	Level of Service	Delay (sec.)	Queue Length (ft)
Intersection 1 - I-70 Ramps				Intersection 4 - E. Bruce Ave.			
EBL	-	-	-	EBL	C	19.1	10
EBT	-	-	-	EBT	C	19.1	10
EBR	-	-	-	EBR	C	19.1	10
WBL	B	12.0	35	WBL	B	13.6	7
WBT	B	12.0	35	WBT	B	13.6	7
WBR	B	12.0	35	WBR	B	13.6	7
NBL	A	9.0	2	NBL	A	9.4	0
NBT	A	0.0	0	NBT	A	0.0	0
NBR	-	-	-	NBR	A	0.0	0
SBL	-	-	-	SBL	A	8.3	3
SBT	A	0.0	0	SBT	A	0.0	0
SBR	A	0.0	0	SBR	A	0.0	0
Intersection 2 - E. Edward Ave. (Unsignalized)				Intersection 5 - S. Front St.			
EBL	F	65.5	67	EBL	C	16.7	2
EBT	B	12.0	22	EBT	C	16.7	2
EBR	B	12.0	22	EBR	C	16.7	2
WBL	F	809.5	546	WBL	C	19.5	42
WBT	B	14.2	20	WBT	C	19.5	42
WBR	B	14.2	20	WBR	C	19.5	42
NBL	A	8.3	10	NBL	A	8.2	0
NBT	A	0.0	0	NBT	A	0.0	0
NBR	A	0.0	0	NBR	A	0.0	0
SBL	A	8.9	11	SBL	A	8.4	3
SBT	A	0.0	0	SBT	A	0.0	0
SBR	A	0.0	0	SBR	A	0.0	0
Intersection 3 - Frontage Access				Intersection 6 - E. Witt Ave.			
EBL	-	-	-	EBL	C	15.3	12
EBT	-	-	-	EBT	C	15.3	12
EBR	A	9.6	0	EBR	C	15.3	12
WBL	-	-	-	WBL	C	16.6	1
WBT	-	-	-	WBT	C	16.6	1
WBR	B	10.5	1	WBR	C	16.6	1
NBL	-	-	-	NBL	A	8.3	1
NBT	A	0.0	0	NBT	A	0.0	0
NBR	A	0.0	0	NBR	A	0.0	0
SBL	-	-	-	SBL	A	8.1	0
SBT	A	0.0	0	SBT	A	0.0	0
SBR	A	0.0	0	SBR	A	0.0	0

Figure 16

US-281 - 2035 Level of Service - PM Peak Hour

\*LOS With Development, Signal at Edwards Avenue, and All Improvements

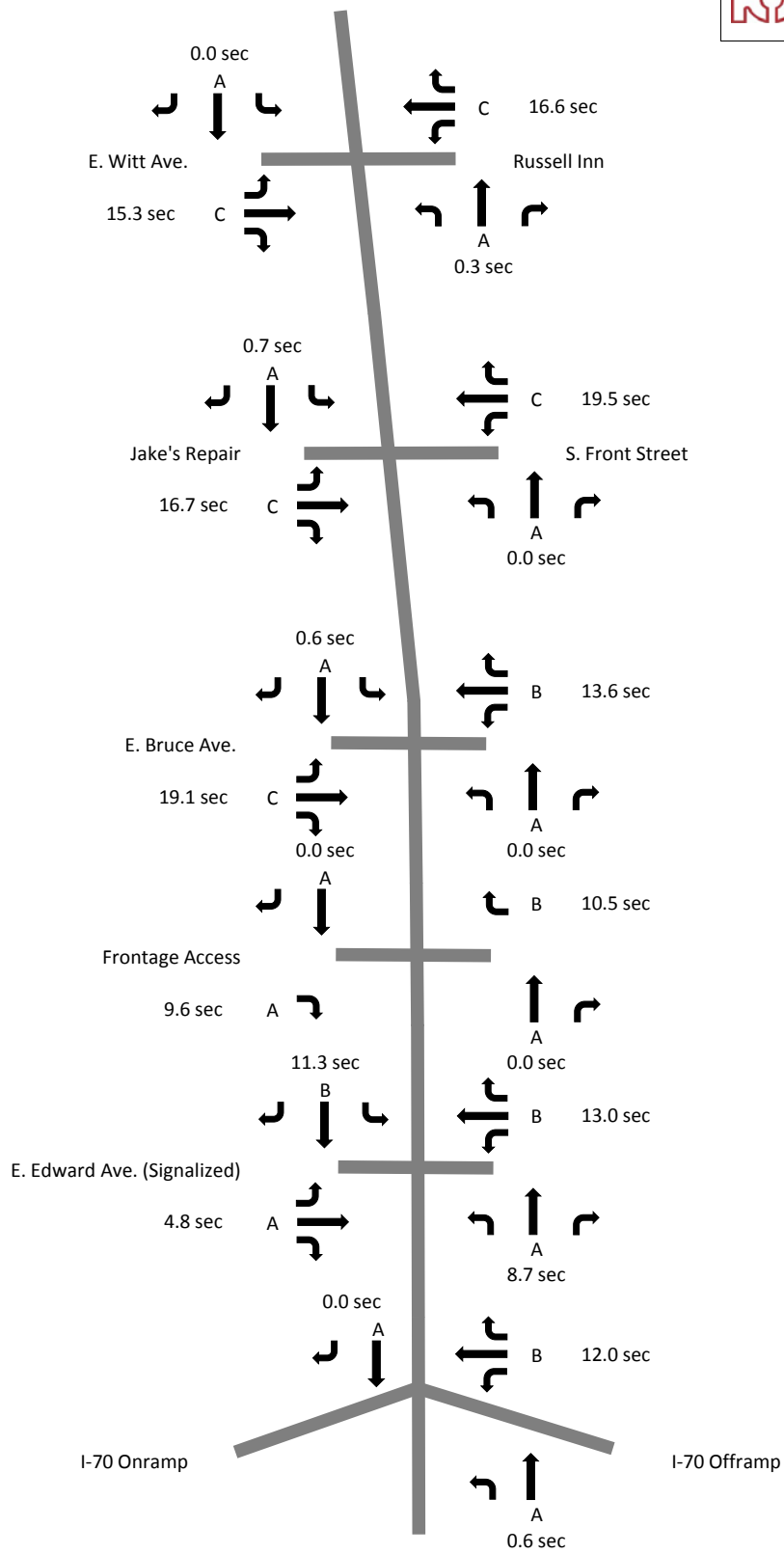


Table 8

2035 with Development - Level of Service, Delay, & Queue Length							
Leg	Level of Service	Delay (sec.)	Queue Length (ft)	Leg	Level of Service	Delay (sec.)	Queue Length (ft)
Intersection 1 - I-70 Ramps				Intersection 4 - E. Bruce Ave.			
EBL	-	-	-	EBL	C	19.1	10
EBT	-	-	-	EBT	C	19.1	10
EBR	-	-	-	EBR	C	19.1	10
WBL	B	12.0	35	WBL	B	13.6	7
WBT	B	12.0	35	WBT	B	13.6	7
WBR	B	12.0	35	WBR	B	13.6	7
NBL	A	9.0	2	NBL	A	9.4	0
NBT	A	0.0	0	NBT	A	0.0	0
NBR	-	-	-	NBR	A	0.0	0
SBL	-	-	-	SBL	A	8.3	3
SBT	A	0.0	0	SBT	A	0.0	0
SBR	A	0.0	0	SBR	A	0.0	0
Intersection 2 - E. Edward Ave. (Signalized)				Intersection 5 - S. Front St.			
EBL	A	8.5	30	EBL	C	16.7	2
EBT	A	3.3	26	EBT	C	16.7	2
EBR	A	3.3	26	EBR	C	16.7	2
WBL	B	14.0	97	WBL	C	19.5	42
WBT	A	3.5	22	WBT	C	19.5	42
WBR	A	3.5	22	WBR	C	19.5	42
NBL	B	11.9	67	NBL	A	8.2	0
NBT	A	8.4	45	NBT	A	0.0	0
NBR	A	2.9	31	NBR	A	0.0	0
SBL	B	11.1	62	SBL	A	8.4	3
SBT	A	6.8	40	SBT	A	0.0	0
SBR	A	6.8	40	SBR	A	0.0	0
Intersection 3 - Frontage Access				Intersection 6 - E. Witt Ave.			
EBL	-	-	-	EBL	C	15.3	12
EBT	-	-	-	EBT	C	15.3	12
EBR	A	9.6	0	EBR	C	15.3	12
WBL	-	-	-	WBL	C	16.6	1
WBT	-	-	-	WBT	C	16.6	1
WBR	B	10.4	1	WBR	C	16.6	1
NBL	-	-	-	NBL	A	8.3	1
NBT	A	0.0	0	NBT	A	0.0	0
NBR	A	0.0	0	NBR	A	0.0	0
SBL	-	-	-	SBL	A	8.1	0
SBT	A	0.0	0	SBT	A	0.0	0
SBR	A	0.0	0	SBR	A	0.0	0

## RECOMMENDATIONS

These recommendations are based on current and projected traffic levels and the assumption that the full development on the east and west sides of Highway 281 occur. Traffic levels will still need to be monitored to ensure that the roadway continues to operate at desired levels.

Recommendations for the near future:

- Realign intersection 2 (see Figure 7) to the north to align with Edward Avenue and the north side of the 24/7 Store.
- Add sidewalks along both Highway 281 frontage roads and pedestrian crosswalks at Intersection 2 (Edward Avenue) and Intersection 4 (Bruce Avenue) to create a safe and predictable location for pedestrians to cross. (see Figure 7)
- Convert Intersection 3 to a right-in, right-out to decrease the frequency of full access intersections.

Recommendations for full development east and west of Highway 281:

- Align Intersections 4 and 5 with the City of Russell owned right-of-way where the new east-west roads would be constructed.
- Consider installing a traffic signal at Intersection 2 (Edward Avenue) when traffic signal warrant criteria is satisfied, because of high traffic volumes and the length of delay for eastbound and westbound traffic and safety concerns.
- Install a right-turn lane for northbound traffic at Intersection 2.

These improvements should result in a roadway that is safer, is more efficient and operates at a desired level of service.

APPENDIX

**Table 4C-1. Warrant 1, Eight-Hour Vehicular Volume**

**Condition A—Minimum Vehicular Volume**

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100% <sup>a</sup>	80% <sup>b</sup>	70% <sup>c</sup>	56% <sup>d</sup>	100% <sup>a</sup>	80% <sup>b</sup>	70% <sup>c</sup>	56% <sup>d</sup>
1	1	500	400	350	280	150	120	105	84
2 or more	1	600	480	420	336	150	120	105	84
2 or more	2 or more	600	480	420	336	200	160	140	112
1	2 or more	500	400	350	280	200	160	140	112

**Condition B—Interruption of Continuous Traffic**

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100% <sup>a</sup>	80% <sup>b</sup>	70% <sup>c</sup>	56% <sup>d</sup>	100% <sup>a</sup>	80% <sup>b</sup>	70% <sup>c</sup>	56% <sup>d</sup>
1	1	750	600	525	420	75	60	53	42
2 or more	1	900	720	630	504	75	60	53	42
2 or more	2 or more	900	720	630	504	100	80	70	56
1	2 or more	750	600	525	420	100	80	70	56

<sup>a</sup> Basic minimum hourly volume

<sup>b</sup> Used for combination of Conditions A and B after adequate trial of other remedial measures

<sup>c</sup> May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

<sup>d</sup> May be used for combination of Conditions A and B after adequate trial of other remedial measures when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

**Table 4-26. Right-turn treatment guidelines for four-lane highways**

Highway DDHV (vph)	Highway Operating Speed (mph)											
	40		45		50		55		60		65	
	Lane	Taper	Lane	Taper	Lane	Taper	Lane	Taper	Lane	Taper	Lane	Taper
300						55	75	25	19	9	19	9
400			145	65	75	30	40	17	16	8	15	8
500		140	95	50	57	25	32	14	14	7	13	7
600	160	80	65	30	42	18	26	11	12	6	12	6
800	70	40	37	18	28	12	19	8	11	5	11	5
1200	25	14	20	10	18	8	14	6	8	4	8	4
1600	15	8	14	6	13	6	10	5	7	3	7	3
2000	10	6	9	6	9	4	8	4	6	3	6	3

Source: "Guidelines for right-turn treatments at unsignalized intersections and driveways," K-Tran:KSU-95-5, Kansas Department of Transportation, Kansas State University, Tanweer Hasan, Dr. Robert W. Stokes

- Turning speed is 15 mph (right-turn)
- The values presented in this table represent minimum right-turn design hour volumes (vph) required to warrant right-turn treatments (lane or taper)
- DDHV = directional design hourly volumes



## 2015 TRAFFIC COUNTS

### Intersection 1 - I-70 On and Off Ramps

Start Time	Southbound				Westbound				Northbound				Eastbound			
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30	11	14	0	0	6	0	0	0	0	21	4	0	0	0	0	0
6:45	16	12	0	0	13	0	2	0	0	19	1	0	0	0	0	0
7:00	16	32	0	0	7	0	1	0	0	22	3	0	0	0	0	0
7:15	19	20	0	0	12	0	4	0	0	18	4	0	0	0	0	0
7:30	21	19	0	0	14	0	0	0	0	21	7	0	0	0	0	0
7:45	20	22	0	0	13	0	0	0	0	42	2	0	0	0	0	0
8:00	17	25	0	0	14	0	3	0	0	27	4	0	0	0	0	0
8:15	18	30	0	0	9	0	0	0	0	27	5	0	0	0	0	0
8:30	28	21	0	0	10	0	1	0	0	30	8	0	0	0	0	0
8:45	17	24	0	0	16	0	0	0	0	36	4	0	0	0	0	0
9:00	19	29	0	0	16	0	0	0	0	38	6	0	0	0	0	0
9:15	26	24	0	0	19	0	0	0	1	28	2	0	0	0	0	0
9:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30	20	32	0	0	10	0	4	0	0	36	6	0	2	0	1	0
11:45	25	31	0	0	14	0	0	0	0	44	6	0	1	0	0	0
12:00	17	26	0	0	26	0	0	0	2	35	3	0	0	0	0	0
12:15	32	28	0	0	29	0	0	0	0	26	4	0	0	0	0	0
12:30	27	22	0	0	18	0	2	0	0	39	6	0	0	0	0	0
12:45	35	21	0	0	23	0	1	0	0	38	7	0	0	0	0	0
1:00	29	41	0	0	17	0	0	0	0	43	3	0	0	0	0	0
1:15	23	28	0	0	17	0	1	0	0	30	2	0	0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30	29	39	0	0	17	0	1	0	0	33	8	0	0	0	0	0
3:45	30	25	0	0	15	0	1	0	0	40	10	0	0	0	0	0
4:00	22	46	0	0	20	0	3	0	0	44	6	0	0	0	0	0
4:15	21	33	0	0	15	0	0	0	0	37	6	0	0	0	0	0
4:30	24	34	0	0	18	0	0	0	0	36	6	0	0	0	0	0
4:45	25	26	0	0	21	0	2	0	0	48	3	0	0	0	0	0
5:00	23	36	0	0	8	0	1	0	0	49	11	0	0	0	0	0
5:15	27	44	0	0	15	0	0	0	0	43	3	0	0	0	0	0
5:30	24	33	0	0	18	0	0	0	0	41	3	0	0	0	0	0
5:45	18	43	0	0	16	0	2	0	0	39	4	0	0	0	0	0
6:00	18	29	0	0	15	1	2	0	0	34	5	0	0	0	0	0
6:15	18	29	0	0	18	0	0	0	0	48	8	0	0	0	0	0

### Intersection 2 - Edwards Avenue

Start Time	Southbound				Westbound				Northbound				Eastbound			
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30	1	12	7	0	2	0	8	0	9	15	2	0	4	1	4	0
6:45	1	12	5	0	4	0	12	0	11	19	1	0	4	5	2	0
7:00	1	22	7	0	4	0	22	0	11	17	2	0	4	0	2	0
7:15	2	25	4	0	5	0	9	0	11	19	0	0	3	0	0	0
7:30	1	26	8	0	5	0	15	0	12	21	0	0	1	0	1	0
7:45	2	21	9	0	6	0	18	0	11	40	3	0	4	1	0	0
8:00	3	23	9	0	7	1	14	0	17	21	5	0	4	2	1	0
8:15	4	27	14	0	7	1	13	0	12	17	4	0	10	1	3	0
8:30	1	17	9	0	4	0	21	0	13	21	5	0	9	1	2	0
8:45	3	20	17	0	7	1	17	0	14	27	8	0	5	1	1	0
9:00	2	24	9	0	7	3	19	0	18	29	2	0	7	1	3	0
9:15	5	25	8	0	7	1	14	0	17	23	13	0	12	3	1	0
9:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30	3	20	11	0	8	0	21	0	13	21	7	0	11	2	2	0
11:45	6	35	15	0	5	2	14	0	12	38	8	0	8	4	4	0
12:00	8	22	12	0	6	1	18	0	28	39	4	0	7	3	2	0
12:15	9	28	14	0	7	1	21	0	20	26	7	0	8	3	1	0
12:30	5	26	8	0	7	1	19	0	18	31	6	0	8	2	4	0
12:45	3	18	11	0	8	0	29	0	19	38	11	0	12	2	4	0
1:00	6	41	12	0	7	4	17	0	12	28	7	0	10	2	7	0
1:15	3	21	8	0	6	0	20	0	16	38	8	0	19	1	4	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30	6	44	6	0	2	0	13	0	19	22	9	0	10	1	1	0
3:45	6	27	8	0	5	1	14	0	14	29	11	0	17	2	3	0
4:00	5	33	5	0	2	0	18	0	19	34	10	0	8	1	5	0
4:15	4	31	7	0	10	1	18	0	11	30	14	0	10	2	4	0
4:30	4	31	5	0	4	1	19	0	15	25	16	0	14	5	6	0
4:45	4	24	10	0	2	2	18	0	20	41	10	0	9	2	5	0
5:00	6	35	5	0	6	2	15	0	14	42	7	0	12	0	2	0
5:15	6	34	18	0	4	0	17	0	14	31	10	0	9	2	1	0
5:30	3	32	6	0	3	1	17	0	18	35	7	0	10	1	7	0
5:45	2	26	4	0	3	4	19	0	15	34	12	0	11	1	2	0
6:00	7	39	8	0	5	1	8	0	12	34	6	0	5	2	4	0
6:15	2	27	9	0	7	1	13	0	20	30	8	0	11	3	6	0

Intersection 3 - Frontage Road Access

Start Time	Southbound				Westbound				Northbound				Eastbound			
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30	1	16	0	0	1	1	0	0	0	22	0	0	1	0	0	0
6:45	1	35	0	0	0	0	0	0	1	29	2	0	0	0	1	0
7:00	1	27	0	0	0	0	0	0	1	15	3	0	0	0	2	0
7:15	1	39	2	0	0	0	2	0	0	24	3	0	0	0	5	0
7:30	3	42	0	0	0	1	1	0	0	32	0	0	0	0	1	0
7:45	1	26	1	0	1	0	2	0	1	46	2	0	2	0	2	0
8:00	2	33	0	0	1	0	0	0	0	31	0	0	0	0	0	0
8:15	1	37	1	0	1	0	1	0	0	29	1	0	3	0	1	0
8:30	0	36	4	0	1	0	0	0	0	34	0	0	1	0	2	0
8:45	2	28	0	0	1	0	0	0	0	41	0	0	0	0	1	0
9:00	2	38	1	0	1	0	1	0	1	26	1	0	0	0	5	0
9:15	2	37	0	0	3	0	0	0	0	29	1	0	0	0	0	0
9:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30	5	42	4	0	3	4	0	0	5	34	0	0	0	2	0	0
11:45	12	40	1	0	1	1	0	0	1	22	4	0	1	0	10	0
12:00	13	30	8	0	2	0	0	0	3	48	4	0	1	0	3	0
12:15	8	52	3	0	2	0	2	0	1	28	1	0	1	0	6	0
12:30	5	35	2	0	3	0	1	0	1	37	3	0	0	0	3	0
12:45	5	41	2	0	6	0	0	0	3	39	3	0	1	1	5	0
1:00	2	43	0	0	5	1	0	0	1	32	1	0	2	0	4	0
1:15	1	39	0	0	1	0	0	0	1	38	3	0	2	2	2	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30	1	47	2	0	0	0	0	0	2	23	1	0	0	2	2	0
3:45	4	47	2	0	3	0	0	0	1	39	3	0	0	0	1	0
4:00	1	54	1	0	0	0	0	0	0	33	0	0	0	0	0	0
4:15	1	21	1	0	4	0	0	0	1	40	0	0	0	0	2	0
4:30	5	30	1	0	2	0	0	0	3	31	1	0	1	0	2	0
4:45	5	41	3	0	1	0	0	0	4	46	3	0	1	0	1	0
5:00	4	70	4	0	3	0	0	0	3	41	3	0	1	0	2	0
5:15	3	43	1	0	2	0	1	0	1	39	2	0	1	0	2	0
5:30	3	33	0	0	0	0	0	0	0	53	1	0	0	0	2	0
5:45	1	31	2	0	1	1	0	0	3	48	0	0	1	1	5	0
6:00	3	34	2	0	4	0	0	0	1	40	0	0	1	0	6	0
6:15	4	26	3	0	2	0	0	0	3	46	4	0	0	0	4	0

Intersection 4 - Frontage Access

Start Time	Southbound				Westbound				Northbound				Eastbound				
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
6:30	1	19	1	0	0	0	0	0	1	24	0	0	0	0	0	0	0
6:45	4	27	1	0	1	0	1	0	0	26	0	0	0	0	2	0	0
7:00	7	28	1	0	0	0	5	0	0	19	0	0	0	0	5	0	0
7:15	2	46	2	0	3	0	0	0	0	28	0	0	0	1	4	0	0
7:30	4	43	3	0	2	0	1	0	2	27	0	0	1	0	2	0	0
7:45	4	21	8	0	6	0	2	0	4	48	0	0	2	0	2	0	0
8:00	2	22	4	0	6	0	3	0	1	31	0	0	1	1	2	0	0
8:15	0	39	4	0	1	0	1	0	2	28	0	0	0	2	2	0	0
8:30	5	36	3	0	4	0	2	0	1	36	0	0	0	0	2	0	0
8:45	0	27	4	0	4	0	2	0	0	39	1	0	1	0	5	0	0
9:00	2	42	3	0	2	0	1	0	0	39	0	0	1	1	1	0	0
9:15	2	37	2	0	2	0	2	0	0	32	0	0	0	0	1	0	0
9:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30	12	50	1	0	1	0	2	0	3	37	2	0	2	0	2	0	0
11:45	5	48	5	0	4	1	3	0	1	34	1	0	1	0	2	0	0
12:00	8	50	7	0	2	0	3	0	1	46	1	0	0	0	4	0	0
12:15	8	57	10	0	3	0	3	0	1	39	1	0	1	1	1	0	0
12:30	3	44	6	0	5	1	0	0	2	39	0	0	1	0	3	0	0
12:45	9	46	6	0	2	0	1	0	1	53	0	0	2	1	7	0	0
1:00	1	35	4	0	3	0	5	0	4	37	0	0	0	0	5	0	0
1:15	6	46	6	0	4	1	3	0	4	33	0	0	1	0	4	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30	2	45	8	0	4	0	5	0	1	30	0	0	1	0	0	0	0
3:45	1	39	6	0	4	0	3	0	1	41	0	0	0	0	2	0	0
4:00	1	58	11	0	2	0	3	0	1	33	0	0	0	0	3	0	0
4:15	4	23	4	0	1	0	3	0	0	42	0	0	1	0	1	0	0
4:30	1	35	4	0	3	0	0	0	0	40	0	0	1	0	2	0	0
4:45	5	43	5	0	1	0	2	0	2	41	0	0	0	0	1	0	0
5:00	5	81	3	0	1	0	3	0	0	48	0	0	0	0	3	0	0
5:15	7	44	5	0	1	0	3	0	1	45	1	0	1	0	1	0	0
5:30	5	37	2	0	1	0	1	0	1	55	0	0	0	0	4	0	0
5:45	3	32	4	0	2	1	2	0	0	51	0	0	0	0	0	0	0
6:00	1	37	6	0	3	0	0	0	0	52	0	0	0	1	2	0	0
6:15	2	32	7	0	2	0	4	0	4	50	0	0	1	1	1	0	0

Intersection 5 - South Front Street

Start Time	Southbound				Westbound				Northbound				Eastbound			
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30	0	19	0	0	0	0	3	0	1	20	0	0	0	0	1	0
6:45	0	24	0	0	0	0	1	0	3	25	0	0	0	0	0	0
7:00	0	39	0	0	0	0	0	0	3	32	0	0	0	0	0	0
7:15	0	37	0	0	0	0	6	0	2	32	0	0	0	0	0	0
7:30	0	37	1	0	1	0	4	0	4	31	0	0	0	0	0	0
7:45	0	34	3	0	2	0	5	0	4	53	2	0	0	0	0	0
8:00	0	42	1	0	0	0	5	0	3	34	0	0	0	0	0	0
8:15	1	34	0	0	2	0	2	0	3	38	0	0	0	0	0	0
8:30	0	32	1	0	1	0	8	0	6	34	0	0	0	0	0	0
8:45	1	32	1	0	1	0	3	0	4	41	0	0	0	0	0	0
9:00	0	44	0	0	0	0	1	0	6	39	0	0	0	0	0	0
9:15	0	46	1	0	2	0	4	0	4	40	0	0	0	0	0	0
9:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30	0	55	0	0	1	0	4	0	3	37	1	0	0	0	0	0
11:45	1	63	1	0	4	0	5	0	3	51	0	0	0	0	1	0
12:00	0	77	0	0	4	0	3	0	6	49	2	0	0	0	0	0
12:15	1	46	2	0	6	0	3	0	5	38	1	0	0	1	0	0
12:30	0	39	1	0	5	0	2	0	3	34	1	0	0	0	0	0
12:45	0	44	0	0	6	0	1	0	1	55	1	0	0	0	0	0
1:00	0	50	0	0	2	0	3	0	0	46	1	0	0	0	0	0
1:15	0	40	0	0	2	0	2	0	4	40	0	0	0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30	1	31	0	0	4	0	3	0	3	44	3	0	1	0	0	0
3:45	0	37	2	0	6	0	2	0	1	47	0	0	0	0	0	0
4:00	2	42	1	0	1	0	3	0	2	35	0	0	0	0	0	0
4:15	0	35	0	0	6	2	3	0	7	46	0	0	0	0	0	0
4:30	0	51	1	0	5	0	6	0	1	46	0	0	0	0	1	0
4:45	1	45	0	0	6	0	3	0	4	32	0	0	0	0	0	0
5:00	0	42	3	0	5	1	6	0	2	58	0	0	0	0	0	0
5:15	1	51	1	0	2	0	3	0	7	45	0	0	0	1	1	0
5:30	0	61	1	0	2	0	4	0	9	53	0	0	0	0	2	0
5:45	0	52	1	0	1	0	3	0	5	40	0	0	0	0	0	0
6:00	0	60	2	0	4	0	2	0	7	57	1	0	0	0	0	0
6:15	0	43	3	0	6	0	2	0	5	59	0	0	0	0	0	0

### Intersection 6 - East Witt Avenue

Start Time	Southbound				Westbound				Northbound				Eastbound			
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30	1	20	0	0	0	0	0	0	0	18	1	0	1	0	2	0
6:45	7	22	1	0	1	0	0	0	0	22	5	0	1	0	3	0
7:00	2	34	0	0	0	0	0	0	1	27	4	0	2	0	4	0
7:15	3	37	0	0	1	0	0	0	1	32	3	0	1	0	3	0
7:30	1	40	0	0	0	0	0	0	0	29	0	0	1	1	3	0
7:45	2	33	1	0	0	0	1	0	0	51	4	0	5	1	4	0
8:00	6	35	0	0	0	0	0	0	0	29	9	0	5	0	7	0
8:15	2	34	1	0	0	0	0	0	0	39	3	0	2	0	2	0
8:30	7	34	1	0	0	0	0	0	0	29	4	0	1	0	2	0
8:45	2	29	0	0	1	0	0	0	0	36	6	0	4	0	5	0
9:00	8	36	2	0	0	2	2	0	0	40	3	0	5	1	2	0
9:15	2	46	0	0	0	0	0	0	0	34	3	0	4	0	5	0
9:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30	4	46	0	0	0	0	0	0	0	35	1	0	7	0	6	0
11:45	3	59	1	0	0	0	0	0	1	52	4	0	6	0	2	0
12:00	5	70	0	0	0	0	0	0	0	45	6	0	3	0	3	0
12:15	5	58	1	0	1	0	0	0	0	43	2	0	0	0	7	0
12:30	5	39	0	0	0	0	0	0	0	33	5	0	1	0	3	0
12:45	5	44	0	0	0	0	1	0	0	53	4	0	1	1	3	0
1:00	8	43	0	0	0	0	0	0	0	50	2	0	5	0	6	0
1:15	5	44	0	0	1	0	0	0	1	41	2	0	2	0	7	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30	6	32	0	0	1	0	0	0	1	47	1	0	2	1	7	0
3:45	3	38	0	0	2	0	0	0	0	49	5	0	2	0	4	0
4:00	9	38	1	0	0	0	0	0	0	35	1	0	4	1	4	0
4:15	5	34	0	0	1	0	0	0	0	51	1	0	3	0	5	0
4:30	3	49	1	0	1	1	0	0	0	44	3	0	5	0	9	0
4:45	4	41	0	0	0	0	0	0	1	38	2	0	1	1	9	0
5:00	8	47	1	0	1	0	1	0	1	55	6	0	4	0	4	0
5:15	4	55	0	0	0	0	1	0	0	44	1	0	2	0	2	0
5:30	2	52	0	0	0	0	0	0	0	58	2	0	5	0	6	0
5:45	3	52	0	0	0	0	0	0	1	39	2	0	1	0	2	0
6:00	6	59	0	0	0	0	1	0	0	56	4	0	3	0	5	0
6:15	4	44	0	0	0	1	1	0	0	56	3	0	1	1	6	0

CRASH REPORT PROVIDED BY KDOT



**KANSAS DEPARTMENT OF TRANSPORTATION  
BUREAU OF TRANSPORTATION PLANNING  
Geometric and Accident Data Unit**

**MOTOR VEHICLE ACCIDENT ANALYSIS**

**PROJECT:** KA-4176-01

**ROUTE:** US-281

**COUNTY:** Russell

**LOCATION:** Accident data on US-281 frm I-70 through the E Witt Ave intersection for the past five years

**LENGTH:** 0.500 miles

**TIME PERIOD:** January 1st, 2009 through December 31st, 2013

This analysis location reflects a 4-lane, divided, full access control, rural roadway for all of its length.

Million vehicle miles of travel per analysis period: **9.25**

AADT (Average Annual Daily Traffic): **10,136**

YEAR	ACCIDENTS				PEOPLE	
	Total	Fatal	Injury	P.D.O.*	Deaths	Injuries
2009	2	0	1	1	0	1
2010	6	0	1	5	0	1
2011	3	0	2	1	0	2
2012	2	0	0	2	0	0
2013	1	0	0	1	0	0
<b>TOTALS:</b>	<b>14</b>	<b>0</b>	<b>4</b>	<b>10</b>	<b>0</b>	<b>4</b>

\* Property Damage Only

**5-Year Rates:**

Overall accident rate per million miles of vehicle travel:	<b>1.514</b>
Statewide overall accident rate for similar roadway type:	<b>0.676</b>
Fatal accident rate per 100 million miles of vehicle travel:	<b>0.000</b>
Statewide fatal accident rate for similar roadway type:	<b>0.547</b>

Note: Short segments or minimal AADT could adversely skew accident rates.

Year	Date	At Road	Accident Class	CWOV	Fixed Object	Accident Location	# of Vehs	Total Accs	Fatal Accs	Injury Accs	PDO Accs	# of Deaths	# of Injd	Time	Weather	Light Conditions	Study Location
2010	11/02/10	I070	Other Motor Vehicle	Angle - Side Impact		Interchange area	2	1	0	1	0	0	1	1333	No adverse conditions	Daylight	Int 1
2010	01/12/10	FRONT	Fixed Object		Curb	Non-Intersection	1	1	0	0	1	0	0	1815	No adverse conditions	Dark: Street Lights On	Non-Int
2011	04/06/11	I070	Other Motor Vehicle	Head On		Interchange area	2	1	0	0	1	0	0	1809	No adverse conditions	Daylight	Int 1
2011	02/09/11	I070	Fixed Object		Fence/Gate	Interchange area	1	1	0	0	1	0	0	0800	Snow	Daylight	Int 1
2011	07/08/11	FRONTAGE	Other Motor Vehicle	Angle - Side Impact		Intersection	2	1	0	1	0	0	1	1725	No adverse conditions	Daylight	Int 2
2011	11/06/11	FRONTAGE RD	Other Motor Vehicle	Angle - Side Impact		Intersection	2	2	0	0	2	0	0	1942	No adverse conditions	Dark: Street Lights On	Int 2
2011	03/18/11	FRONT	Other Motor Vehicle	Angle - Side Impact		Intersection	2	1	0	0	1	0	0	1406	No adverse conditions	Daylight	Int 3
2012	09/14/12	FRONT	Fixed Object		Curb	Non-Intersection	1	1	0	1	0	0	1	2222	No adverse conditions	Dark: Street Lights On	Non-Int
2012	02/06/12	FRONT	Other Motor Vehicle	Angle - Side Impact		Intersection	2	1	0	1	0	0	1	1353	No adverse conditions	Daylight	Int 2
2012	06/29/12	EDWARDS	Fixed Object	Sideswipe: Same Direction	Curb	Non-Intersection	2	1	0	0	1	0	0	1450	No adverse conditions	Daylight	Non-Int
2013	02/25/13	EDWARDS	Other Motor Vehicle	Angle - Side Impact		Intersection-related	2	1	0	0	1	0	0	0608	Snow	Dark: Street Lights On	Int 2
2013	01/25/13	WITT	Fixed Object		Sign Post	Non-Intersection	1	1	0	0	1	0	0	1335	No adverse conditions	Daylight	Non-Int
2014	06/11/14	I070	Fixed Object		Divider, Median Barrier	Interchange area	1	1	0	0	1	0	0	2314	Rain, mist, or drizzle	Dark: Street Lights On	Int 1

# 2015 EXISTING SYNCHRO TRAFFIC REPORT

Lanes, Volumes, Timings  
 1: US-281 & I-70 On Ramp/I-70 Off Ramp

2/29/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕		↗	↕			↕	
Volume (vph)	0	0	0	3	0	70	20	204	0	0	141	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	160		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt					0.870							0.938
Flt Protected					0.998		0.950					
Satd. Flow (prot)	0	0	0	0	1434	0	1641	3167	0	0	3130	0
Flt Permitted					0.998		0.950					
Satd. Flow (perm)	0	0	0	0	1434	0	1641	3167	0	0	3130	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		289			325			341			322	
Travel Time (s)		6.6			7.4			7.8			7.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	67%	2%	13%	10%	14%	2%	2%	9%	7%
Adj. Flow (vph)	0	0	0	3	0	76	22	222	0	0	153	109
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	79	0	22	222	0	0	262	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	





















Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	24.9%
ICU Level of Service	A
Analysis Period (min)	15

# Lanes, Volumes, Timings

## 2: US-281 & S2

2/29/2016

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	17	5	40	67	5	17	34	174	66	42	134	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	65		0	90		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.912			0.975			0.959				0.980
Flt Protected		0.987			0.963		0.950			0.950		
Satd. Flow (prot)	0	1576	0	0	1620	0	1656	3108	0	1752	3300	0
Flt Permitted		0.987			0.963		0.950			0.950		
Satd. Flow (perm)	0	1576	0	0	1620	0	1656	3108	0	1752	3300	0
Link Speed (mph)		30			30			30				30
Link Distance (ft)		154			153			322				399
Travel Time (s)		3.5			3.5			7.3				9.1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	12%	10%	2%	13%	9%	10%	15%	3%	8%	2%
Adj. Flow (vph)	18	5	43	73	5	18	37	189	72	46	146	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	66	0	0	96	0	37	261	0	46	168	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free				Free

### Intersection Summary

Area Type: Other

Control Type: Unsignalized



















Intersection Capacity Utilization 31.9% ICU Level of Service A

Analysis Period (min) 15

# Lanes, Volumes, Timings

## 3: US-281 & S3

2/29/2016

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	7	0	3	1	0	6	9	191	8	8	192	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	95		0	80		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.963			0.882			0.994			0.989	
Flt Protected		0.965			0.994		0.950			0.950		
Satd. Flow (prot)	0	1599	0	0	1633	0	1626	3330	0	1770	3280	0
Flt Permitted		0.965			0.994		0.950			0.950		
Satd. Flow (perm)	0	1599	0	0	1633	0	1626	3330	0	1770	3280	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		152			132			399			339	
Travel Time (s)		3.5			3.0			9.1			7.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	33%	2%	2%	2%	11%	8%	2%	2%	9%	7%
Adj. Flow (vph)	8	0	3	1	0	7	10	208	9	9	209	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	11	0	0	8	0	10	217	0	9	225	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

### Intersection Summary

Area Type: Other

Control Type: Unsignalized



















Intersection Capacity Utilization 17.5% ICU Level of Service A

Analysis Period (min) 15

Lanes, Volumes, Timings

8: US-281 & S4

2/29/2016

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	9	0	1	9	0	4	1	199	4	15	205	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	95		0	90		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.988			0.961			0.997			0.985	
Flt Protected		0.957			0.966		0.950			0.950		
Satd. Flow (prot)	0	1620	0	0	1729	0	902	3387	0	1770	3283	0
Flt Permitted		0.957			0.966		0.950			0.950		
Satd. Flow (perm)	0	1620	0	0	1729	0	902	3387	0	1770	3283	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		150			140			339			644	
Travel Time (s)		3.4			3.2			7.7			14.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	100%	2%	2%	2%	100%	5%	75%	2%	9%	2%
Adj. Flow (vph)	10	0	1	10	0	4	1	216	4	16	223	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	11	0	0	14	0	1	220	0	16	247	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	



















Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	22.5%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings

11: US-281 & S5

2/29/2016

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	3	1	0	18	1	15	0	190	22	5	224	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	85		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt					0.942			0.984				0.999
Flt Protected		0.964			0.974					0.950		
Satd. Flow (prot)	0	1796	0	0	1709	0	1863	3326	0	1770	3403	0
Flt Permitted		0.964			0.974					0.950		
Satd. Flow (perm)	0	1796	0	0	1709	0	1863	3326	0	1770	3403	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		151			122			644			560	
Travel Time (s)		3.4			2.8			14.6			12.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	7%	5%	2%	6%	2%
Adj. Flow (vph)	3	1	0	20	1	16	0	207	24	5	243	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	4	0	0	37	0	0	231	0	5	245	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	





















Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	16.3%
ICU Level of Service	A
Analysis Period (min)	15



Lanes, Volumes, Timings  
14: US-281 & E Witt Ave

2/29/2016

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	21	1	13	2	0	1	11	195	2	1	216	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	120		0	65		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.950			0.955			0.999				0.988
Flt Protected		0.971			0.968		0.950			0.950		
Satd. Flow (prot)	0	1682	0	0	1722	0	1530	3403	0	1770	3375	0
Flt Permitted		0.971			0.968		0.950			0.950		
Satd. Flow (perm)	0	1682	0	0	1722	0	1530	3403	0	1770	3375	0
Link Speed (mph)		30			30			30				30
Link Distance (ft)		194			136			560				316
Travel Time (s)		4.4			3.1			12.7				7.2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	8%	2%	2%	2%	18%	6%	2%	2%	6%	2%
Adj. Flow (vph)	23	1	14	2	0	1	12	212	2	1	235	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	38	0	0	3	0	12	214	0	1	255	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free				Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	19.1%
Analysis Period (min)	15
	ICU Level of Service A

# 2035 BACKGROUND TRAFFIC SYNCHRO TRAFFIC REPORT

Lanes, Volumes, Timings  
 1: US-281 & I-70 On Ramp/I-70 Off Ramp

2/29/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕		↕	↑↑			↑↑	
Volume (vph)	0	0	0	4	1	92	26	269	0	0	187	132
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	160		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt					0.871						0.938	
Flt Protected					0.998		0.950					
Satd. Flow (prot)	0	0	0	0	1469	0	1671	3223	0	0	3147	0
Flt Permitted					0.998		0.950					
Satd. Flow (perm)	0	0	0	0	1469	0	1671	3223	0	0	3147	0
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		289			325			341			377	
Travel Time (s)		6.6			7.4			5.2			5.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	50%	2%	11%	8%	12%	2%	2%	8%	7%
Adj. Flow (vph)	0	0	0	4	1	100	28	292	0	0	203	143
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	105	0	28	292	0	0	346	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	28.7%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
2: US-281 & S2

2/29/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	31	7	53	90	7	23	56	217	88	66	176	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	75		100	75		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.868			0.886			0.957			0.981	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1477	0	1770	1481	0	1504	3251	0	1703	3067	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1477	0	1770	1481	0	1504	3251	0	1703	3067	0
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		154			153			377			450	
Travel Time (s)		4.2			4.2			5.7			6.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	13%	2%	50%	2%	20%	8%	2%	6%	11%	46%
Adj. Flow (vph)	34	8	58	98	8	25	61	236	96	72	191	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	34	66	0	98	33	0	61	332	0	72	219	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	34.1%
Analysis Period (min)	15
	ICU Level of Service A

# Lanes, Volumes, Timings

## 3: US-281 & S3

2/29/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	4	0	0	8	0	260	11	0	264	20
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	95		0	80		0
Storage Lanes	0		1	0		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.865			0.865		0.994			0.989	
Flt Protected												
Satd. Flow (prot)	0	0	1611	0	0	1096	0	3360	0	0	3341	0
Flt Permitted												
Satd. Flow (perm)	0	0	1611	0	0	1096	0	3360	0	0	3341	0
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		152			132			344			308	
Travel Time (s)		4.1			3.6			5.2			4.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	2%	2%	50%	2%	50%	8%	7%	2%	2%	7%	5%
Adj. Flow (vph)	0	0	4	0	0	9	0	283	12	0	287	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	4	0	0	9	0	295	0	0	309	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

### Intersection Summary

Area Type: Other

Control Type: Unsignalized



















Intersection Capacity Utilization 17.9%

ICU Level of Service A

Analysis Period (min) 15

Lanes, Volumes, Timings  
8: US-281 & S4

2/29/2016

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	12	1	1	12	1	5	1	262	5	20	271	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.991			0.964			0.997				0.985
Flt Protected		0.958			0.967		0.950			0.950		
Satd. Flow (prot)	0	1683	0	0	1669	0	1203	3276	0	1719	3310	0
Flt Permitted		0.958			0.967		0.950			0.950		
Satd. Flow (perm)	0	1683	0	0	1669	0	1203	3276	0	1719	3310	0
Link Speed (mph)		25			25			45				45
Link Distance (ft)		150			140			308				627
Travel Time (s)		4.1			3.8			4.7				9.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	2%	2%	8%	2%	2%	50%	10%	2%	5%	8%	2%
Adj. Flow (vph)	13	1	1	13	1	5	1	285	5	22	295	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	15	0	0	19	0	1	290	0	22	327	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free				Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	25.1%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings

11: US-281 & S5

2/29/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕↔		↕	↕↔	
Volume (vph)	4	1	1	24	1	20	1	249	29	7	295	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.977			0.939			0.984			0.999	
Flt Protected		0.968			0.974		0.950			0.950		
Satd. Flow (prot)	0	1762	0	0	1494	0	1770	3239	0	1770	3403	0
Flt Permitted		0.968			0.974		0.950			0.950		
Satd. Flow (perm)	0	1762	0	0	1494	0	1770	3239	0	1770	3403	0
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		151			145			627			606	
Travel Time (s)		4.1			4.0			9.5			9.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	29%	2%	2%	2%	10%	7%	2%	6%	2%
Adj. Flow (vph)	4	1	1	26	1	22	1	271	32	8	321	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	6	0	0	49	0	1	303	0	8	323	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other



















Control Type: Unsignalized

Intersection Capacity Utilization 18.2% ICU Level of Service A

Analysis Period (min) 15

Lanes, Volumes, Timings  
14: US-281 & E Witt Ave

2/29/2016

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	28	1	17	2	1	1	14	257	2	1	285	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	125		0	75		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.950			0.966			0.999			0.988	
Flt Protected		0.970			0.976		0.950			0.950		
Satd. Flow (prot)	0	1717	0	0	1422	0	1770	3270	0	1770	3345	0
Flt Permitted		0.970			0.976		0.950			0.950		
Satd. Flow (perm)	0	1717	0	0	1422	0	1770	3270	0	1770	3345	0
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		194			136			606			316	
Travel Time (s)		5.3			3.7			9.2			4.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	50%	2%	2%	2%	10%	50%	2%	7%	2%
Adj. Flow (vph)	30	1	18	2	1	1	15	279	2	1	310	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	49	0	0	4	0	15	281	0	1	336	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	21.9%
ICU Level of Service	A
Analysis Period (min)	15



2035 PROPOSED IMPROVEMENT (UNSIGNALIZED) SYNCHRO TRAFFIC  
REPORT

Lanes, Volumes, Timings  
 1: US-281 & I-70 On Ramp/I-70 Off Ramp

2/29/2016

























Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕		↗	↕			↕	↗
Volume (vph)	0	0	0	4	1	219	26	368	0	0	272	273
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	160		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt					0.868						0.925	
Flt Protected					0.999		0.950					
Satd. Flow (prot)	0	0	0	0	1503	0	1671	3312	0	0	3165	0
Flt Permitted					0.999		0.950					
Satd. Flow (perm)	0	0	0	0	1503	0	1671	3312	0	0	3165	0
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		289			325			341			377	
Travel Time (s)		6.6			7.4			5.2			5.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	50%	2%	9%	8%	9%	2%	2%	6%	5%
Adj. Flow (vph)	0	0	0	4	1	238	28	400	0	0	296	297
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	243	0	28	400	0	0	593	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	42.1%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
2: US-281 & S2

2/29/2016

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	62	7	132	215	7	89	136	243	208	128	198	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	75		200	75		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.858			0.861			0.931			0.967	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1541	0	1770	1548	0	1671	3130	0	1770	3018	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1541	0	1770	1548	0	1671	3130	0	1770	3018	0
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		154			153			377			450	
Travel Time (s)		4.2			4.2			5.7			6.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	6%	2%	50%	2%	8%	12%	2%	2%	15%	18%
Adj. Flow (vph)	67	8	143	234	8	97	148	264	226	139	215	61
Shared Lane Traffic (%)												
Lane Group Flow (vph)	67	151	0	234	105	0	148	490	0	139	276	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	



















Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	54.3%
ICU Level of Service	A
Analysis Period (min)	15

# Lanes, Volumes, Timings



















## 3: US-281 & S3

2/29/2016

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								 			 	
Volume (vph)	0	0	4	0	0	8	0	374	20	0	378	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	95		0	80		0
Storage Lanes	0		1	0		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.865			0.865		0.992			0.992	
Flt Protected												
Satd. Flow (prot)	0	0	1611	0	0	1096	0	3416	0	0	3355	0
Flt Permitted												
Satd. Flow (perm)	0	0	1611	0	0	1096	0	3416	0	0	3355	0
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		152			132			344			308	
Travel Time (s)		4.1			3.6			5.2			4.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	50%	2%	5%	2%	2%	7%	2%
Adj. Flow (vph)	0	0	4	0	0	9	0	407	22	0	411	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	4	0	0	9	0	429	0	0	433	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	
<b>Intersection Summary</b>												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	21.1%						ICU Level of Service A					
Analysis Period (min)	15											

Lanes, Volumes, Timings  
8: US-281 & S4

2/29/2016



















												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	1	2	16	1	21	2	371	9	36	380	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.992			0.924			0.996			0.984	
Flt Protected		0.956			0.980		0.950			0.950		
Satd. Flow (prot)	0	1735	0	0	1660	0	1203	3334	0	1752	3337	0
Flt Permitted		0.956			0.980		0.950			0.950		
Satd. Flow (perm)	0	1735	0	0	1660	0	1203	3334	0	1752	3337	0
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		150			140			308			627	
Travel Time (s)		4.1			3.8			4.7			9.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	2%	2%	6%	2%	2%	50%	8%	2%	3%	7%	2%
Adj. Flow (vph)	33	1	2	17	1	23	2	403	10	39	413	51
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	36	0	0	41	0	2	413	0	39	464	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	28.9%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
11: US-281 & S5

2/29/2016



















												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	1	1	85	1	49	1	328	93	33	377	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.977			0.951			0.967			0.999	
Flt Protected		0.968			0.969		0.950			0.950		
Satd. Flow (prot)	0	1762	0	0	1636	0	1770	3249	0	1770	3403	0
Flt Permitted		0.968			0.969		0.950			0.950		
Satd. Flow (perm)	0	1762	0	0	1636	0	1770	3249	0	1770	3403	0
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		151			145			627			606	
Travel Time (s)		4.1			4.0			9.5			9.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	10%	2%	2%	2%	9%	2%	2%	6%	2%
Adj. Flow (vph)	4	1	1	92	1	53	1	357	101	36	410	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	6	0	0	146	0	1	458	0	36	412	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	34.2%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
14: US-281 & E Witt Ave

2/29/2016

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	1	17	2	1	1	14	365	2	1	393	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	125		0	75		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.957			0.966			0.999				0.989
Flt Protected		0.968			0.976		0.950			0.950		
Satd. Flow (prot)	0	1726	0	0	1422	0	1770	3333	0	1770	3407	0
Flt Permitted		0.968			0.976		0.950			0.950		
Satd. Flow (perm)	0	1726	0	0	1422	0	1770	3333	0	1770	3407	0
Link Speed (mph)		25			25			45				45
Link Distance (ft)		194			136			606				316
Travel Time (s)		5.3			3.7			9.2				4.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	50%	2%	2%	2%	8%	50%	2%	5%	2%
Adj. Flow (vph)	38	1	18	2	1	1	15	397	2	1	427	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	57	0	0	4	0	15	399	0	1	461	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 22.8% ICU Level of Service A

Analysis Period (min) 15

2035 PROPOSED IMPROVEMENT (SIGNALIZED) SYNCHRO TRAFFIC  
REPORT



Lanes, Volumes, Timings  
 1: US-281 & I-70 On Ramp/I-70 Off Ramp

2/29/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕		↗	↕			↕	
Volume (vph)	0	0	0	4	1	219	26	368	0	0	272	273
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	160		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt					0.868						0.925	
Flt Protected					0.999		0.950					
Satd. Flow (prot)	0	0	0	0	1503	0	1671	3312	0	0	3165	0
Flt Permitted					0.999		0.950					
Satd. Flow (perm)	0	0	0	0	1503	0	1671	3312	0	0	3165	0
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		289			325			341			377	
Travel Time (s)		6.6			7.4			5.2			5.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	50%	2%	9%	8%	9%	2%	2%	6%	5%
Adj. Flow (vph)	0	0	0	4	1	238	28	400	0	0	296	297
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	243	0	28	400	0	0	593	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	42.1%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
2: US-281 & S2

2/29/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	62	7	132	215	7	89	136	243	208	128	198	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	75		75	75		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.858			0.861				0.850		0.967	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1541	0	1770	1548	0	1671	3223	1583	1770	3018	0
Flt Permitted	0.689			0.661			0.582			0.589		
Satd. Flow (perm)	1283	1541	0	1231	1548	0	1024	3223	1583	1097	3018	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		143			97				226		61	
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		154			153			377			344	
Travel Time (s)		4.2			4.2			5.7			5.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	6%	2%	50%	2%	8%	12%	2%	2%	15%	18%
Adj. Flow (vph)	67	8	143	234	8	97	148	264	226	139	215	61
Shared Lane Traffic (%)												
Lane Group Flow (vph)	67	151	0	234	105	0	148	264	226	139	276	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		

# Lanes, Volumes, Timings

## 2: US-281 & S2

2/29/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		20.0	20.0	20.0	20.0	20.0	
Total Split (s)	31.0	31.0		31.0	31.0		29.0	29.0	29.0	29.0	29.0	
Total Split (%)	51.7%	51.7%		51.7%	51.7%		48.3%	48.3%	48.3%	48.3%	48.3%	
Maximum Green (s)	27.0	27.0		27.0	27.0		25.0	25.0	25.0	25.0	25.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	0.5	0.5		0.5	0.5		0.5	0.5	0.5	0.5	0.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		Min	Min	Min	Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effect Green (s)	12.7	12.7		12.7	12.7		14.4	14.4	14.4	14.4	14.4	
Actuated g/C Ratio	0.36	0.36		0.36	0.36		0.40	0.40	0.40	0.40	0.40	
v/c Ratio	0.15	0.24		0.53	0.17		0.36	0.20	0.29	0.31	0.22	
Control Delay	8.5	3.3		14.0	3.5		11.9	8.4	2.9	11.1	6.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	8.5	3.3		14.0	3.5		11.9	8.4	2.9	11.1	6.8	
LOS	A	A		B	A		B	A	A	B	A	
Approach Delay		4.9			10.7			7.3			8.2	
Approach LOS		A			B			A			A	
90th %ile Green (s)	22.7	22.7		22.7	22.7		21.6	21.6	21.6	21.6	21.6	
90th %ile Term Code	Hold	Hold		Gap	Gap		Gap	Gap	Gap	Hold	Hold	
70th %ile Green (s)	15.0	15.0		15.0	15.0		14.2	14.2	14.2	14.2	14.2	
70th %ile Term Code	Hold	Hold		Gap	Gap		Gap	Gap	Gap	Hold	Hold	
50th %ile Green (s)	10.9	10.9		10.9	10.9		10.6	10.6	10.6	10.6	10.6	
50th %ile Term Code	Hold	Hold		Gap	Gap		Gap	Gap	Gap	Hold	Hold	
30th %ile Green (s)	8.7	8.7		8.7	8.7		7.8	7.8	7.8	7.8	7.8	
30th %ile Term Code	Hold	Hold		Gap	Gap		Gap	Gap	Gap	Hold	Hold	
10th %ile Green (s)	7.6	7.6		7.6	7.6		18.7	18.7	18.7	18.7	18.7	
10th %ile Term Code	Hold	Hold		Gap	Gap		Dwell	Dwell	Dwell	Dwell	Dwell	
Queue Length 50th (ft)	6	1		25	1		16	13	0	14	11	
Queue Length 95th (ft)	30	26		97	22		67	45	31	62	40	
Internal Link Dist (ft)		74			73			297			264	
Turn Bay Length (ft)							75		75	75		
Base Capacity (vph)	1012	1245		971	1242		763	2402	1237	817	2264	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.07	0.12		0.24	0.08		0.19	0.11	0.18	0.17	0.12	

### Intersection Summary

Area Type: Other

# Lanes, Volumes, Timings

## 2: US-281 & S2

2/29/2016

Cycle Length: 60

Actuated Cycle Length: 35.6

Natural Cycle: 40

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.53

Intersection Signal Delay: 7.9

Intersection LOS: A

Intersection Capacity Utilization 48.6%

ICU Level of Service A

Analysis Period (min) 15

90th %ile Actuated Cycle: 52.3

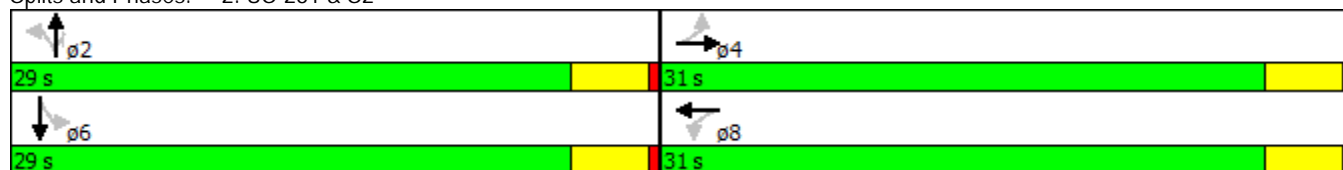
70th %ile Actuated Cycle: 37.2

50th %ile Actuated Cycle: 29.5

30th %ile Actuated Cycle: 24.5

10th %ile Actuated Cycle: 34.3

Splits and Phases: 2: US-281 & S2



# Lanes, Volumes, Timings

## 3: US-281 & S3

2/29/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗			↗		↕↗			↕↗	
Volume (vph)	0	0	4	0	0	8	0	374	20	0	378	20
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	95		0	80		0
Storage Lanes	0		1	0		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.865			0.865		0.992			0.992	
Flt Protected												
Satd. Flow (prot)	0	0	1611	0	0	1096	0	3416	0	0	3355	0
Flt Permitted												
Satd. Flow (perm)	0	0	1611	0	0	1096	0	3416	0	0	3355	0
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		152			132			344			308	
Travel Time (s)		4.1			3.6			5.2			4.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	50%	2%	5%	2%	2%	7%	2%
Adj. Flow (vph)	0	0	4	0	0	9	0	407	22	0	411	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	4	0	0	9	0	429	0	0	433	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

### Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 21.1% ICU Level of Service A

Analysis Period (min) 15

# Lanes, Volumes, Timings

## 8: US-281 & S4

2/29/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕↔		↕	↕↔	
Volume (vph)	30	1	2	16	1	21	2	371	9	36	380	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.992			0.924			0.996			0.984	
Flt Protected		0.956			0.980		0.950			0.950		
Satd. Flow (prot)	0	1735	0	0	1660	0	1203	3334	0	1752	3337	0
Flt Permitted		0.956			0.980		0.950			0.950		
Satd. Flow (perm)	0	1735	0	0	1660	0	1203	3334	0	1752	3337	0
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		150			140			308			627	
Travel Time (s)		4.1			3.8			4.7			9.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	2%	2%	6%	2%	2%	50%	8%	2%	3%	7%	2%
Adj. Flow (vph)	33	1	2	17	1	23	2	403	10	39	413	51
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	36	0	0	41	0	2	413	0	39	464	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

### Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 28.9% ICU Level of Service A

Analysis Period (min) 15

Lanes, Volumes, Timings

11: US-281 & S5

2/29/2016





















Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕↔		↕	↕↔	
Volume (vph)	4	1	1	85	1	49	1	328	93	33	377	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.977			0.951			0.967			0.999	
Flt Protected		0.968			0.969		0.950			0.950		
Satd. Flow (prot)	0	1762	0	0	1636	0	1770	3249	0	1770	3403	0
Flt Permitted		0.968			0.969		0.950			0.950		
Satd. Flow (perm)	0	1762	0	0	1636	0	1770	3249	0	1770	3403	0
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		151			145			627			606	
Travel Time (s)		4.1			4.0			9.5			9.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	10%	2%	2%	2%	9%	2%	2%	6%	2%
Adj. Flow (vph)	4	1	1	92	1	53	1	357	101	36	410	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	6	0	0	146	0	1	458	0	36	412	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	34.2%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
14: US-281 & E Witt Ave

2/29/2016

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	1	17	2	1	1	14	365	2	1	393	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	125		0	75		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.957			0.966			0.999				0.989
Flt Protected		0.968			0.976		0.950			0.950		
Satd. Flow (prot)	0	1726	0	0	1422	0	1770	3333	0	1770	3407	0
Flt Permitted		0.968			0.976		0.950			0.950		
Satd. Flow (perm)	0	1726	0	0	1422	0	1770	3333	0	1770	3407	0
Link Speed (mph)		25			25			45				45
Link Distance (ft)		194			136			606				316
Travel Time (s)		5.3			3.7			9.2				4.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	50%	2%	2%	2%	8%	50%	2%	5%	2%
Adj. Flow (vph)	38	1	18	2	1	1	15	397	2	1	427	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	57	0	0	4	0	15	399	0	1	461	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 22.8% ICU Level of Service A

Analysis Period (min) 15